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ABSTRACT

Designed to assist the classroom teacher in keeping abreast of the most recent instructional and technical developments in the field of drafting, this guide includes information that has been identified and validated by incumbent workers, trade unions, professional organizations, and teachers. It is also designed to be of use to curriculum specialists, administrators, and supervisors in the development of a performance-based instructional program. Four sections are included: How to Develop and Implement a Performance-Based Instructional Program describes this type of program and discusses its various components; Occupational Information covers, in relation to drafting, the nature of the work, working conditions, places of employment, training, qualifications and advancement, employment outlook, earnings, and 11 D.O.T. job descriptions. This section is also designed to serve as a complement to technical instruction and as a source of guidance information; Curriculum Resources presents descriptions of a variety of instructional and curriculum materials, including curriculum guides, learning activity packages, course outlines, books, transparencies, film, and filmstrips; and General Resources describes resources within Maryland and the nation. A source listing, providing addresses of various institutions, commercial business and publishers, and other organizations, is appended. (HD)

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Resource Guide For Performance-Based **DRAFTING** Instruction

Gerald F. Day
Dennis R. Herschbach

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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Gerald F. Day
Dennis R. Herschbach
Project Directors

INTRODUCTION

A perennial problem in curriculum development is the determination of what should be taught. This problem has a direct impact on everyday classroom instruction. In vocational education, this problem takes on an added dimension. If an occupational field were to remain stabilized in terms of invention, technique, and specialization, few changes would be anticipated, and the instructional development process would be greatly simplified. However, there are few occupational fields which are not experiencing rapid, if not almost continual change.

It is not enough to simply identify and select for inclusion in the instructional program the skills and knowledge a worker has needed in the past. The rapid pace of technical and occupational change necessitates frequent if not continual upgrading and restructuring of the instructional program. In order for occupational instruction to be relevant, it is necessary for the classroom teacher to base instruction on the actual skills, knowledge, and attitudes that are currently needed on the job.

This resource guide is designed to assist the classroom teacher in keeping abreast of the most recent instructional and technical developments in the field. The information included is the most current, and it has been identified and validated by incumbent workers, trade unions, professional organizations, and teachers.

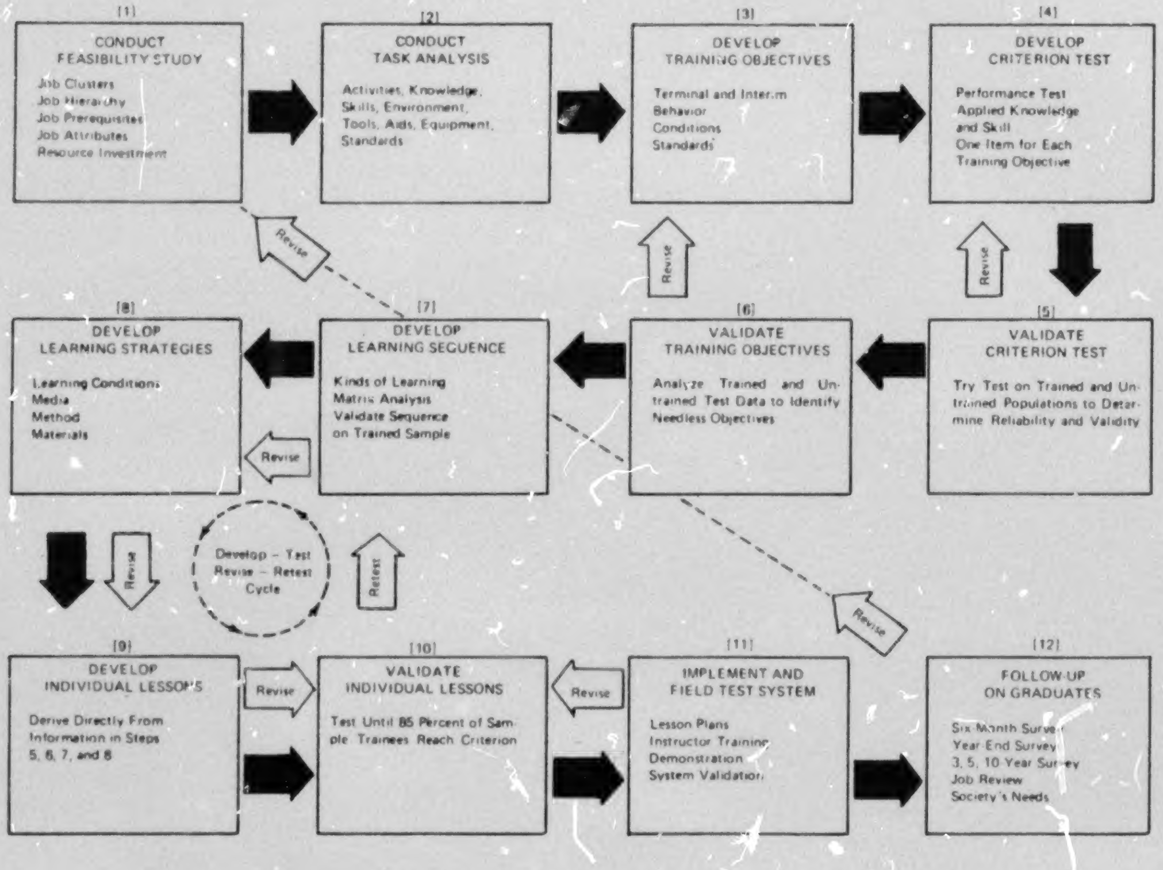
Not only is it important that vocational education keep abreast of the technical progress of a field of study, but current developments in instructional design should be reflected in programs. The use of individualized instructional materials and a modular program structure helps to achieve the instructional flexibility essential to meeting individual student needs. Included in this guide are current developments in instructional technology that the instructor should examine inasmuch as they represent the leading efforts throughout the United States. In this way, the instructor is provided with check points with which to compare local program features.

The guide is organized in a number of sections to facilitate its use. The first section describes what a performance-based instructional program is and how such a program can be developed. The second section contains occupational information which can serve as a complement to technical instruction, as well as a source of guidance information. A variety of instructional and curriculum materials, including curriculum guides, learning activity packages, course outlines, books, transparencies, films, and filmstrips are included in the next section. The fourth section describes general resources within Maryland and the nation, and the last section contains a listing of source addresses.

There are a number of practical points which the individual should keep in mind when using this guide:

1. Every effort should be made to collect and examine curriculum materials which seem appropriate. Not only can a great deal of duplication of effort be avoided by utilizing existing information, but an understanding of the current state-of-the-art provides a solid foundation on which to structure program development.

2. Curriculum development should be considered an on-going process, not a one-time effort. This process can be simplified by using a systematic approach for developing and evaluating the instructional program. Many of the curriculum resources in this guide have successfully used systems approaches to curriculum development. It is suggested that each school develop a system which will work in its own particular situation. The following is one such example that has been developed by Butler (1972) and is explained in his book Instructional Systems Development for Vocational and Technical Training.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3. It is suggested that curriculum development be approached through the use of committees. Committees can provide a forum for discussion and a means of obtaining feedback on ideas. In addition, the work load can be shared among the members of the committee.

4. Finally, a curriculum resource center can be a useful tool in curriculum development. It is advantageous to establish a center which can serve as both a central place to collect curriculum materials and as a convenient place to work. If personnel, funds, and other resources make a school-based center unreasonable, there are resources in Maryland and nationwide which educators are encouraged to use. These resources are listed in the General Resources Section of this guide.

In summary, the overall purpose of this guide is to help facilitate in the all-important task of program development and upgrading. The teacher is provided with information about resource materials which can be examined, selected, and integrated into the instructional program. In addition, the resources provided should also assist curriculum specialists, administrators, and supervisors in the development of a performance-based instructional program.

HOW TO DEVELOP AND IMPLEMENT A PERFORMANCE-BASED INSTRUCTIONAL PROGRAM

What is a Performance-Based Instructional Program?

One of the major goals of vocational education is to provide instruction that is realistic in terms of job performance. When the student completes the instructional program, it is to be expected that he or she will be able to perform successfully on the job. To realize this goal, it is essential that instructional content that relates to the actual work situation be identified. It is only by identifying job tasks performed by the everyday worker that the instructional program will reflect real job demands. In the general sense, then, a performance-based instructional program simply means that the student should be able to perform certain designated tasks at the level of proficiency required on the job. Both the job tasks and the proficiency levels are realistic inasmuch as they are identified by examining the actual everyday job activities of successful workers.

A performance-based instructional program can be more specifically defined by certain characteristics:

1) Course content material is generally identified through task analysis. Task analysis provides a means of identifying job tasks which are important to performance. The focus is upon the job tasks and task elements involved in work activity in order to break down the activity into its fundamental skill, knowledge and attitudinal components. These components make up the instructional content.

2) Instructional content is expressed in the form of performance objectives. Performance objectives translate job tasks into learning outcomes. In other words, they explicitly spell out what behaviors the student must master in order to perform successfully on the job. Performance objectives also identify job conditions and standards.

3) Student progress is assessed through the use of criterion-referenced measures. A criterion-referenced test is constructed to yield measurements that indicate how well the job task has been mastered. If the goal of instruction is successful job performance, it is important to know if the required performance levels have been attained.

Performance-based instructional programs may also include the use of employability profiles or training achievement records and individualized instructional materials. These instructional aids help ensure that the program is realistic in terms of job activity, efficient, and designed to accommodate individual student differences.

TASK ANALYSIS

Task analysis is one of the most important steps in developing a performance-based instructional program. It is through task analysis that the instructional content is identified. Needless to say, it is essential that this content realistically reflect job activity in the work setting. Because all other instructional components are derived from the content identified through task analysis, it is of great importance that this identification be sound.

It is important that instructional content reflect actual job requirements. Task analysis involves the gathering of information from incumbent workers through the use of a questionnaire, work observation, interviews, or some other method which solicits feedback. The task analysis procedure generally consists of at least two steps: a task inventory and a task description. The purpose of a task inventory is to determine which tasks performed by incumbents represent significant job activity in the field under study. Tasks which are significant become instructional content. Incumbents are then asked to identify and rank important work tasks. This enables the instructional designer to determine which task statements are important for instructional purposes.

The tasks identified must next be fully described. Task statements are too general to be of great value in determining the knowledge and skill components involved in work activity. Each task must be broken down into the steps or task elements involved in the performance of the task.

It is also necessary to describe the conditions under which the incumbent must perform the work. Performance conditions may include machines, tools, equipment and work aids, special manuals or reference materials, physical or social demands, and environmental factors. Because conditions relate directly to job performance, they must be identified and accounted for in developing instruction.

Just as it is necessary to describe job conditions, it is important to identify performance standards in terms of accuracy and time required for successful task accomplishment. Since the goal of performance-based instruction is for the student to be able to perform successfully on the job, the standards which constitute satisfactory performance must be identified.

The purpose of task description, then, is to clearly delineate the performance necessary for successful task completion. This makes it possible to write performance objectives, develop learning strategies, design student activities, and devise evaluation measures to assess successful task performance.

The utilization of task inventory and task description information in developing a performance-based instructional program cannot be overstressed. It is the foundation upon which all other instructional components are structured. A comprehensive and systematically-derived inventory and description provide the validity essential to the instructional development process.

In the Curriculum Resources Section of this guide are listed resources which identify validated task analyses. This material, in general, is of high quality and low cost. The instructional developer merely has to secure the sources which appear relevant to his or her specific program needs. In most cases, it will be found that the material can be utilized in the local situation with very little modification.

Maryland is a member of the Vocational-Technical Education Consortium of States (V-TECS). Available through V-TECS are catalogs of task analyses. These catalogs represent what is probably the most comprehensive, current, and vigorously developed task analysis material in the country. This information can be secured through your local curriculum liaison person for vocational-technical education or from the Western Maryland Vocational Resource Center. Information related to V-TECS and the Western Maryland Vocational Resource Center can be found on pages 51 and 84 .

PERFORMANCE OBJECTIVES

While task analysis provides a means of identifying content for an effective instructional program, it is necessary to translate this content into performance objectives. That is, it is essential to spell out what students will be able to do upon the completion of instruction. Objectives are grounded in task statements, but the focus is shifted to learner capabilities which can be observed and measured. In other words, while task analysis information identifies job activity, performance objectives identify the student behaviors which indicate that the capability to perform the job activity has been attained.

A performance objective is made up of three components: 1) a statement of student performance or behavior in observable and measurable terms; 2) a description of the conditions under which the student is expected to perform the task; and 3) a precise description of the acceptable level of performance or criterion. An example of a performance objective would be:

> Given the proper drafting equipment, a three-view mechnical drawing, and an isometric grid, the student will make an isometric sketch of the object so that it is accurate, neat, and proportional.

The performance indicated in the objective is a clear statement of expected student behavior. By being able to observe and measure this behavior, it is possible to determine exactly what the student has accomplished in regard to job activity. The conditions stated in the objective indicate essential aspects of job performance. The individual, for example, may have to use particular tools, equipment or procedures in carrying out a task. These conditions are indicated in the objectives because they indicate actual job requirements. Similarly, the criterion indicates the level of performance the student must attain in order to successfully complete the task. If the student can perform at the specified criterion level, then it can be reasonably expected that he or she will function satisfactorily on the job.

As in the case of task analysis information, the Curriculum Resources Section of this guide provides resources related to the construction and use of performance objectives. Also, the V-TECS catalogs provide a complete listing of performance objectives corresponding to the job tasks identified in different occupational fields.

CRITERION-REFERENCED MEASUREMENT

Another characteristic of a performance-based instructional program is the use of criterion-referenced measurement (CRM). A criterion-referenced test (CRT) or measure is one that is constructed to yield measurements which are directly interpretable in terms of specified performance standards. A CRT is directly related to the performance objectives of the program, and should indicate whether an individual has or has not mastered each of the objectives.

The major advantage of using CRM is that the student is evaluated according to predetermined job standards rather than compared with other students. In vocational education, it is more important to know if the student can successfully perform the job activity than to know his or her relative ranking as compared with other students. Because a CRT assesses the ability of a student to perform on the job, it is essential that the test reflect as closely as possible the actual job environment, rather than artificial classroom situations. It follows that a CRT usually, but not always, involves the manipulation of tools, equipment, materials and objects utilized in work activity.

The use of CRM enables the instructional developer to build both quality and flexibility into a program. Quality is achieved because a student progresses on the basis of the attainment of explicitly-stated performance standards. One is assured that a minimum level of performance has been attained before the student progresses on to other objectives and instructional units. Program flexibility is achieved because student progress is linked to task attainment rather than exposure to a predetermined amount of instructional time. Accordingly, the time allotted to reach the designed performance levels may vary among students. Instructional methodology and student activities may also vary.

OTHER INSTRUCTIONAL COMPONENTS

In addition to the use of task analysis, performance objectives, and criterion-referenced measurement, other instructional components may be utilized to develop and implement a performance-based program. Employability profiles or training achievement records are often used to record student progress through the program. Profiles and achievement records provide a means to effectively communicate the attained competencies to prospective employers, parents, teachers, and students. Such a descriptive, criterion-referenced recording system conveys much more than a letter grade of A, B, or C.

Another component of a performance-based program may be the use of learning activity packages (LAPs) and instructional sheets. A LAP can be designed to cover each terminal performance objective. It is designed to focus upon one skill and can provide the basis for an individualized, student-paced, and student-directed learning program. Other instructional aids, such as assignment sheets and job sheets, assist in developing an individualized program. In fact, a whole range of instructional media and techniques can be utilized in a performance-based program, including simulations, role playing, computer-assisted instruction, educational television, and on-the-job training. Because the time required for attainment of the instructional objectives may vary greatly from student to student in a performance-based instructional program, it is necessary to provide for individualization of instruction. The use of various teaching strategies and instructional media can also provide a means of matching instruction with a particular student learning style.

A modular instructional design also helps to accommodate individual student differences. A modular program, if well-designed, can facilitate the development of an open-entry/open-exit program since the student can work independently and progress at his or her own pace. Helpful references for utilizing a modular format, as well as references related to learning activity packages and other instructional aids, are included in the Curriculum Resources Section.

PROGRAM CHARACTERISTICS

A performance-based instructional program, then, includes various instructional components. While these components are not necessarily new to education and training, they are organized in order to achieve certain educational results. In general, a performance-based instructional program includes the following characteristics:

1. Instruction is individualized and personalized. There is opportunity for variation among students with respect to the objectives they pursue at a

given time, the method or mode of instruction, and the materials used for learning. Instruction is self-paced, with the student having some choice in the selection of objectives and learning activities under the guidance of the teacher. Time may vary among students for the attainment of the objectives, thus permitting slower students to take more time and faster ones to proceed to advanced training or enter the job market. Different instructional goals may also be set for different students depending upon their occupational interests and abilities within the program area. Thus, the student plays a greater role in the learning process, and the teacher acts more as a facilitator and motivator.

2. The program is open-entry/open-exit. That is, when a student has achieved the required competencies, he or she should receive credit for the training and move on to advanced training or the job market. There may be many entry and exit points throughout the training program, reflecting different job and skill levels within an occupation. In other words, each student is accepted at his or her level of achievement. Instruction is designed to enable each individual to progress and exit at an appropriate job level.

3. The student, as well as the teacher, is held accountable for performance. The individual knows what he or she is expected to demonstrate and must accept the responsibility, along with the teacher, of meeting the identified performance standards. In so doing, the student is encouraged to assume more responsibility for the instructional process.

4. Learning is guided by feedback. Student progress is monitored closely in relation to the stated objectives in order to provide reinforcement and motivation for learning. In addition, it is possible to diagnose student deficiencies so that remedial instruction can be provided.

5. Before instruction starts, a student is aware of what competencies he or she will be expected to achieve. Both the learner and teacher are fully aware of the expectations and the criteria for attaining the training objectives. Students are also told how they will be evaluated.

6. Student progress is determined by the demonstration of the ability to successfully perform job activity in the field which he or she is preparing to enter. Performance is the key, and the demon-

stration of job competencies is the basis of student progress. Upon completion of instruction, the student can be expected to perform the required entry-level tasks.

IMPLEMENTING A PERFORMANCE-BASED PROGRAM

Curriculum development can be accomplished more effectively through the use of an instructional systems approach. A systems approach is merely an organized way of going about instructional development so that key components are identified and essential feedback is provided. The analysis, design, development, integration, and evaluation of the many instructional components can be more effectively carried out. Common components of a systems approach might include the following:

1. Conduct a needs assessment. This includes determining the most important occupational areas for implementing a performance-based instructional system.

2. Determine the performance requirements of the occupation for which students will be trained. This analysis should reflect realistic worker tasks and be comprehensive.

3. Develop performance objectives and criterion-referenced measures. Both the objectives and criterion-referenced measures relate to job tasks and include job conditions and standards.

4. Field test and revise the objectives and criterion-referenced measures. Since the objectives and test items represent important components of a performance-based instructional system, it is essential that accuracy and clarity be achieved. Field testing provides a means for building in this quality.

5. Identify incoming student characteristics and abilities. This will help facilitate individualizing of instruction.

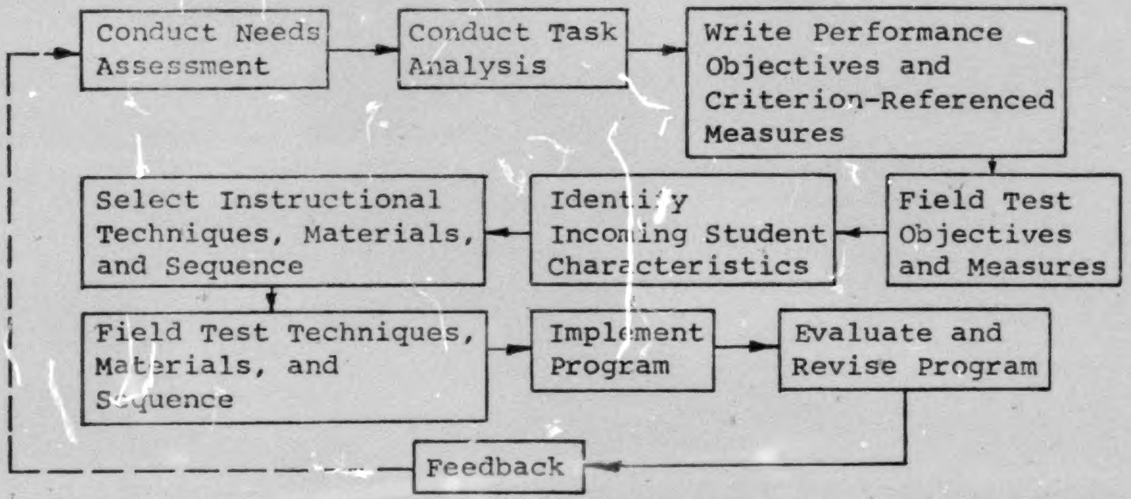
6. Select the appropriate instructional techniques and sequence that will be most effective in achieving the instructional objectives. Prepare appropriate instructional materials.

7. Field test and revise the instructional materials, techniques, and sequence.

8. Implement the instructional program.

9. Evaluate and revise the instructional program based on information from students, teachers, parents and employers.

The following figure illustrates the aforementioned steps for developing a performance-based program.


Conduct Needs Assessment
Conduct Task Analysis
Write Performance Objectives and Criterion-Referenced Measures
Field Test Objectives and Measures
Identify Incoming Student Characteristics
Select Instructional Techniques, Materials, and Sequence
Field Test Techniques, Materials, and Sequence
Implement Program
Evaluate and Revise Program
Feedback

An instructional systems approach is a dynamic process which contributes toward meeting the differing and changing needs of individual students. It should be stressed, however, that there is not one model that will serve all purposes and fit all situations. Systems will vary for different programs, organizations, and people.

The aforementioned steps represent a logical way of developing a performance-based instructional system, but these steps should be adapted to local program needs. The resources included in this guide can be used to develop the various instructional components. The teacher should secure those materials which appear relevant to his or her specific instructional program needs. In most cases, the available materials can be utilized with little modification.

EXAMPLES OF CURRICULUM RESOURCES

The following pages contain examples of a variety of curriculum resources, including a task analysis, employability profile, training achievement record, student competency sheet, and learning activity package.

Pages 12 through 22 of the original document are copyrighted and therefore not available. They are not included in the pagination.

OCCUPATIONAL INFORMATION

The occupational information in this section can be useful to the classroom teacher in the following ways:

1) It can serve as a source of reference information from which instructional materials can be developed.

2) It can provide career information to students.

3) It can be used to develop public relations and course description materials for use by guidance counselors, parents, and other interested individuals.

With today's emphasis on career awareness and specialization, vocational teachers should be well informed about their particular field. Teachers should convey to their students the qualifications, working conditions, employment outlook, required job-entry skills, and other career-related information of the occupation. It is not enough to leave the vital career facts of an occupational field to chance exposure.

The material that follows provides basic information that instructors can use to convey an understanding of different occupational aspects of the drafting field. This information should be supplemented with field trips, guest lectures, career days, and other occupational and guidance information.

The information in this section can also be used to develop materials for an area that is often overlooked, namely, public information. Students often like to know about a field of study before they take courses. Parents want to know about the occupational opportunities available to their children. School counselors are required to provide current occupational information to students. The information in this section can be used to develop such descriptive materials in the form of booklets, course descriptions, and career information sheets.

NATURE OF THE WORK

A draftsman prepares clear, complete, and accurate working plans and detailed drawings from rough sketches, specifications, and calculations of engineers, architects, and designers. These drawings are used for engineering and manufacturing purposes. A draftsman utilizes the knowledge of various machines, engineering principles, mathematics, building materials, and other sciences to complete the final drawings. The final drawings may contain a detailed view of the object, specifications of the materials to be used, construction procedures to be followed, and other information needed to make the object.

In preparing the drawing, a draftsman uses a variety of materials and equipment, including compasses, dividers, protractors, templates, and drafting machines. He or she may also use engineering handbooks, tables, and calculators to help solve technical problems. Depending upon the policies of the organization for which the draftsman works, ink or pencil may be used for the drawing.

Draftsmen are classified according to the type of work they perform or their level of responsibility. Senior draftsmen take an engineer's or architect's preliminary plans and make design layouts. Detailers make a complete drawing of each part shown on a design layout, giving such information as dimensions and materials. Checkers carefully examine drawings for errors in computing or recording dimensions and specifications. Tracers make minor corrections and prepare drawings for reproduction by tracing them on transparent paper, cloth, or plastic film. Draftsmen may specialize in a particular field of work, such as mechanical, electrical, electronic, aeronautical, structural, or architectural drafting.

WORKING CONDITIONS

The draftsman usually works in a quiet, well-lighted and well-ventilated room. Many organizations have a central drafting room with many draftsmen working side-by-side. Occasionally, a draftsman may have to visit other locations, such as departments or construction sites, in order to consult with engineers or other personnel. However, a draftsman will spend most of his or her time working alone at the drafting table.

Although a draftsman works alone, he or she usually is part of a team of other draftsmen, engineers, or architects. The draftsman should be able to work long periods of time at the drawing table, while at the same time being able to accept suggestions and demands from others.

Since the work is generally not seasonal, most draftsmen work a 40-hour week. There is generally little pressure on the job. Deadlines may be demanding at times, but this depends upon the nature of the particular assignment.

PLACES OF EMPLOYMENT

About 327,000 draftsmen were employed in 1972, of which 8 percent were women. Private industry employed about 90 percent of these draftsmen. Many work in industries which make machinery, electrical equipment, and fabricated metal products. Other places of employment include engineering and architectural consulting firms, construction companies and public utilities.

Federal, state, and local governments employed about 20,000 draftsmen in 1972. The Defense Department employed most of the draftsmen that worked for the Federal government. Draftsmen employed by state and local governments were mainly in highway and public works departments. Several thousand draftsmen worked for colleges, universities, and nonprofit organizations.

TRAINING, QUALIFICATIONS, AND ADVANCEMENT

An individual interested in becoming a draftsman can acquire the necessary training from several sources, including vocational and technical high schools, junior and community colleges, colleges and universities, on-the-job training, and apprenticeship programs.

Training for a drafting career should include courses in mathematics, physical sciences, and drafting. Shop practices and skills are also helpful since many drafting jobs require knowledge of manufacturing or construction methods. Courses in structural design, strength of materials, and metal technology should also be taken.

Those planning careers in drafting should possess certain characteristics. They must be able to do detailed work requiring a high degree of accuracy. Good eyesight, eye-hand coordination, and manual dexterity are important. Since draftsmen often work directly with engineers, architects, and others, it is important that they be able to function as part of a team. A draftsman should be able to visualize objects and make freehand, three-dimensional drawings. Rendering and artistic ability may be helpful in some specialized fields.

Beginning draftsmen with high school drafting training usually start as tracers. Post-high school technical training often qualifies a person for a junior draftsman position. After experience, junior draftsmen usually advance to checkers, detailers, senior draftsmen, designers, and supervisors. Engineering and mathematics courses sometimes enable a draftsman to transfer to an engineering position.

EMPLOYMENT OUTLOOK

Job opportunities for draftsmen are expected to be favorable through the mid-1980's. Those with post-high school drafting training will have the best prospects for finding employment. Well-qualified high school graduates may find opportunities in some types of jobs.

Employment of draftsmen is expected to rise as a result of the increasingly complex design problems related to modern products and processes. As engineering and scientific occupations continue to grow, more draftsmen will be needed as support personnel. However, the need for less-skilled draftsmen will be reduced because of new techniques in photo-reproduction of drawings and computer drafting.

EARNINGS

Beginning draftsmen in private industry earn about $550 a month. Experienced draftsmen can earn from $10,000 to $12,000 annually. The Federal government paid high school graduates in training programs about $450 a month, with those with post-high school training earning substantially more. The majority of experienced draftsmen working for the Federal government earned between $640 and $800 a month in 1973.

D.O.T. JOB DESCRIPTIONS

The Dictionary of Occupational Titles contains many job titles and descriptions of those involved in drafting activities. The following are some of the more common job classifications related to drafting.

Draftsman I (017.281). Prepares clear, complete, and accurate working plans and detail drawings from rough or detailed sketches or notes for engineering or manufacturing purposes, according to specified dimensions. Makes final sketch of proposed drawing, checking dimensions of parts, materials to be used, relation of one part to another, and relation of various parts to whole structure. Makes any adjustments or changes necessary or desired. Inks in all lines and letters on pencil drawings as required. Exercises manual skill in manipulation of triangles, T-square, and other drafting tools. Lays tracing paper on drawing and traces drawing in ink. Draws charts for representation of statistical data. Draws finished designs from sketches. Utilizes knowledge of various machines, engineering practices, mathematics, building materials, and other physical sciences to complete drawings.

Architectural Draftsman (001.281). Draws architectural and structural features of any class of building and like structures. Sketches designs and details using drawing instruments. Makes engineering computations involved in the strength of materials, beams, and trusses. Estimates quantities needed for project and computes cost. Makes freehand drawings of proposed structure when necessary to clarify plans. Many specialize in planning architectural details according to structural materials.

Civil Draftsman (005.281). Drafts detailed construction drawings, topographical profiles, and related maps and specification sheets used in the planning and construction of highways, river and harbor improvements, flood control, drainage, and other civil engineering projects. Plots maps and charts showing profiles and cross sections, indicating relation of topographical contours and elevations to buildings, retaining walls, tunnels, overhead powerlines, and other structures. Drafts detailed drawings of structures and installations, such as roads, culverts, fresh water supply and sewage disposal systems, dikes, wharfs, and breakwaters. Computes volume on tonnage of excavations and fills, and prepares graphs and hauling diagrams used in earthmoving operations. May accompany survey crew in field to locate grading markers or to collect data required for revision of construction drawings.

Design Draftsman (002.281). A term used to designate workers who make design drawings to assist in developing experimental ideas evolved by research engineers, using specifications and sketches, and employing knowledge of engineering theory and its applications to solve mechanical and fabrication problems.

Detailer (071.281). Makes detailed drawings of parts of machines or structures from rough or general design drawings. Shows dimensions, materials to be used, and other information necessary to make detailed drawings clear and complete. Makes tracing of finished drawing on transparent paper from which blueprints can be made. May specialize in preparing detailed drawings for specific type of machine, structure, or product.

Electrical Draftsman (003.281). Prepares electrical equipment working drawings and wiring diagrams used by construction crews and repairmen who erect, install, and repair electrical equipment and wiring in powerplants, industrial establishments, commercial or domestic buildings, or electrical distribution systems.

Electronic Draftsman (003.281). Drafts wiring diagrams, schematics, and layout drawings used in manufacture, assembly, installation, and repair of electronic equipment, such as television cameras, radio transmitters and receivers, audio-amplifiers, computers, and radiation detectors. Drafts layout and detail drawings of racks, panels, and enclosures. May conduct service and interference studies and prepare maps and charts related to radio and television surveys.

Map Draftsman (017.281). Draws maps of cities, counties, states, and other areas showing location and identity of roads, communities, commercial or industrial structures and installations, political boundaries, and other features. Analyzes survey data, reference maps, and other records to determine location of features, such as primary or secondary roads, overhead powerlines, underground pipelines, oil wells, and railroad tracks. Studies deeds, leases, statutes, and other legal records to establish boundary lines of cities, boroughs, states, counties, districts, regions, and other politically, socially, or economically-determined areas. May originate and revise maps related to commercial or industrial property or contracts.

Mechanical Draftsman (007.281). Specializes in drafting detailed work drawings of machinery and mechanical devices, indicating dimensions and tolerances, fasteners and joining requirements, and other engineering data. Draws multiple-view assembly and subassembly drawings as required for manufacture and repair of mechanisms.

Technical Illustrator (017.281). Lays out and draws illustrations for reproduction in reference works, brochures, and technical manuals dealing with assembly, installation, operation, maintenance, and repair of machines, tools, and equipment. Prepares drawings from blueprints, designs, mockups, and photo-prints by methods and techniques suited to specified reproduction process or final use, such as blueprint, photo-offset, and projection transparencies. Lays out and draws schematic, perspective, orthographic, or oblique-angle objects to depict function, relationship, and assembly sequence of parts and assemblies, such as gears, engines, and instruments. Shades or colors drawing to emphasize details or eliminate undesired background using ink, crayon, airbrush, and overlays. Pastes instructions and comments in position on drawing. May draw cartoons and caricatures to illustrate operation, maintenance, and safety manuals and posters.

Tracer or Junior Draftsman (017.281). Copies plans and drawings prepared by a draftsman by tracing them with ink or pencil on transparent paper, cloth, or plastic film using appropriate drafting equipment. May make simple sketches or drawings under close supervision.

CURRICULUM RESOURCES

There has been a recent surge of interest throughout the country in curriculum and instructional materials development. Many guides, course outlines, and other instructional materials have been and are in the process of being developed. The resources in this section have been collected from many sources, including professional organizations, state education departments, federal agencies, schools, curriculum clearinghouses, research organizations, the commercial market, and universities and colleges. These resources represent the most recent developmental efforts. They provide the classroom teacher with the capability of upgrading and restructuring the instructional program.

While only quality resources have been included, the items which are exceptional and which appear to be valuable for all teachers to at least review are identified by the designation "HIGHLY RECOMMENDED." It is suggested that instructors write for the items which appear most useful for their particular program.

PRINTED MATERIALS

The following section contains descriptions of a variety of printed instructional materials, including curriculum guides, course outlines, learning activity packages, task analyses, occupational inventories, student manuals, performance objectives, and tests. The materials can be obtained by writing to the publishers whose addresses appear in the last section of this guide. Some documents are available through the Educational Resources Information Center (ERIC). ERIC documents can be obtained either in microfiche or hard copy. Write ERIC for ordering details.

Abstracts of Instructional and Research Materials in Vocational and Technical Education (AIM/ARM). The Center for Vocational Education, The Ohio State University, $34.00 per year.

> AIM/ARM is a bimonthly publication that contains annotations and abstracts of research and instructional materials useful to teachers, supervisors, and others interested in vocational and technical education. The AIM section includes abstracts of instructional materials designed for teacher and student use, while the ARM section incorporates abstracts of research and curriculum projects. This publication is a valuable resource for finding out what is going on in the curriculum development and research fields. A computer search of AIM/ARM can be conducted free of charge for Maryland educators through the Information Retrieval and Dissemination System (see page 87). HIGHLY RECOMMENDED.

Airbrush. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.50.

This teacher's guide is an introduction to the airbrush. It includes step-by-step instructions for those who have not used the airbrush. The guide contains objectives and information on equipment cleaning and maintenance, causes and remedies for airbrush errors, suggested rendering projects, and photo retouching.

An Analysis of the Drafting Occupation by G. W. Plescia, R. A. Price, and P. R. Neff. Instructional Materials Laboratory, The Ohio State University, 1974, 156 pp., $3.50.

This book contains an occupational analysis of drafting. Information that is supplied for the 61 tasks includes: tools, equipment, materials, and objects needed; performance knowledge; safety knowledge; and concepts and skills of mathematics, science and communication needed for successful performance in drafting. This data can be used as a basis for developing instructional materials, performance objectives, and criterion-referenced measures.

Architectural Drafting Curriculum Guide. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.00.

This curriculum guide contains a job description of an architectural draftsman, a recommended program of studies, and a shop floor plan.

Architectural Draftsman Study Guide. Instructional Materials Center, The University of Texas at Austin, 1976.

This student's study guide contains assignments for a two-year architectural drafting program. The text Architecture by Spence must be used as a reference for the exercises. A teacher's guide containing answers to the exercise questions, tests, and work sheets is also available.

Architectural Working Drawing Check List I: Commercial, Institutional, and Other Heavy Frame Construction. Guidelines Publications, 1975, $6.00.

This is a check list of what should be on a set of architectural drawings for commercial buildings.

Architectural Working Drawing Check List II: Residential and Other Light Frame Construction. Guidelines Publications, 1975, 67 pp., $6.00.

This is a check list of what should be on a set of residential architectural drawings. All areas are covered, from title blocks to details.

Basic Drafting: A Competency-Based Guide for Students and Teachers by H. Martin. Curriculum Development Center, University of Kentucky, 188 pp., $5.00.

This instructional guide is designed to aid in the organization and teaching of a first-year drafting course. There are two main sections. One is for the student and the other is for the teacher. Blocks of instruction include drafting equipment, geometric constructions, multiview projection, dimensioning, sectioning, auxiliary projection and pictorial drawing. HIGHLY RECOMMENDED.

Basic Drawing. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.00.

The information contained in this book is slanted towards the understanding of drawings. The author discusses orthographic projection, various working drawings, sectional views, and pictorial sketching.

Behavioral Objectives for Selected Units in Drafting. Virginia State Department of Education, 1973, 54 pp., $2.00. Also available from ERIC: ED 094 197.

Behavioral objectives that cover 22 units of instruction are contained in this document.

Building Maintenance Syllabus. New York State Education Department, 1973, 70 pp., $.75.

This instructor's guide for 11th and 12th grade is organized by traditional skill groupings. A list of course content, suggested audiovisuals, and teaching methodology covers skills in masonry, electricity, plumbing, climate control, drafting, and estimating.

Capital Area Career Center: Job Knowledges, Job Skills, Performance Objectives, and Learning Modules. Capital Area Career Center. Complimentary sample materials available upon request.

The Capital Area Career Center in Lansing, Michigan has developed task analyses, performance objectives, and learning modules for their performance-based curriculum in drafting. Each module or learning activity package covers one task identified to be important for entry-level performance. The module contains an introduction, performance objective, prerequisites, material and equipment list, job steps, and technical work list. Examples of the school's curriculum materials can be obtained by writing directly to them.

Carpentry Blueprint Interpretation. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.00.

A beginning book introducing the carpentry student to graphic representation and working drawings of houses and their structural details. The appendix contains useful charts on wood joints, sawing of lumber, nail and screw sizes, and plumbing symbols.

Casting Processes: A Workbook for Drafting and Design Students. Vocational-Technical Curriculum Laboratory, Rutgers University, 1973, 131 pp., $2.00.

A workbook for drafting and design students which will give the student a working knowledge of the various casting processes. Each section is composed of several units which are broken down into lessons. Each lesson contains a behavioral objective, related information, and a section of review questions and problems.

Civil Service Examination Passbooks: Civil Engineering Draftsman ($12.00); Draftsman ($10.00); Drafting Aide ($10.00); Engineering Draftsman ($10.00); Junior Draftsman ($10.00); and Mechanical Engineering Draftsman ($12.00). National Learning Corporation.

Designed for people who are preparing to take civil service examinations dealing with different drafting classifications, these passbooks contain hundreds of multiple-choice questions. Vocational teachers may be able to use some of the questions as long as they measure what is being taught in the classroom.

Competency-Based Vocational Teacher Modules. Wayne State University, 1975, Five Booklets, $17.55.

These five booklets (modules) are aimed at providing vocational teachers with the skills to develop and use a competency-based or performance-based instructional program. The modules cover program goals, performance objectives, objective-referenced testing, choosing the learning activities for the performance objectives, and follow-up and evaluation. These resources can be used by the individual teacher or as part of an inservice program. They are very comprehensive and aimed at the classroom teacher. Slide-tape presentations and transparencies augment the booklets. Modules may be purchased separately. HIGHLY RECOMMENDED.

Computer Graphics: Advanced Assignments by T. Thomas. Oklahoma Curriculum and Instructional Materials Center, 1972, $7.00.

This manual should be used after completing the General Drafting Graphics Systems Manual. Units of instruction have been developed in the following areas: 3-D plotting, stress, analysis, stress plot, coordinate geometry, console plotting, and topography mapping. Each instructional unit includes objectives, suggested activities, information sheets, assignment sheets, transparency masters, and a test and answer key.

Computer Graphics: Instructional Units. Oklahoma Curriculum and Instructional Materials Center, 1975, $4.00.

This publication is designed as a basic course of instruction in the use of the computer as a graphic media. The General Drafting Graphics System (GDGS) constitutes a problem-oriented programming system which allows the user with a minimum of computer application and knowledge to communicate with the computer. Units of instruction have been developed in the following areas: GDGS introduction, coordinate generating commands, plot generating commands, and system applications. Each instructional unit includes objectives, suggested activities, information sheets, and assignment sheets.

Construction Industry Series. Texas Education Agency, 1975. Available from the U. S. Government Printing Office.

Wood-Student Manual	$1.15	82 pp.
Wood-Instructor's Guide	2.85	108 pp.
Finishing-Student Manual	1.55	126 pp.
Finishing-Instructor's Guide	3.45	169 pp.
Engineering, Support & Management Services-Student Manual	1.55	116 pp.
Engineering, Support & Management Services-Instructor's Guide	5.40	259 pp.
Metal-Student Manual	1.55	120 pp.
Metal-Instructor's Manual	5.25	251 pp.
Electricity-Student Manual	.85	53 pp.
Electricity-Instructor's Guide	3.30	157 pp.
Masonry-Student Manual	.90	66 pp.
Masonry-Instructor's Guide	3.00	121 pp.
Articulation Guide	.35	5 pp.
Careers in Construction-Student Manual	1.35	97 pp.
Careers in Construction-Instructor's Guide	4.15	106 pp.

The fifteen documents in the Construction Industry Series are excellent resources for the high school teacher. Each of the six construction areas has a student manual and instructor's guide. Each of the student manuals discusses all of the characteristics of and duties involved in one of the trades. Behavioral objectives, lesson plans, and activities are featured in the instructor's guides. Engineering drafting and architectural drawing are covered in the Engineering, Support, and Management Services books. Well worth the price. HIGHLY RECOMMENDED.

Cooperative Work Experience: An Annotated Resource Guide by D. R. Herschbach, M. Smith, and M. Kessler. Department of Industrial Education, University of Maryland, 1975, 206 pp., $5.00.

Although intended to be used by the teacher-coordinator of a cooperative work experience program, this resource guide lists many valuable instructional materials for the regular classroom teacher. Most vocational areas are covered, including drafting and blueprint reading. HIGHLY RECOMMENDED.

Curriculum for Careers: Technical Drafting. Harper and Row, 1976. Student Learning Plans ($3.95), Teacher Implementation Plan ($25.00), Evaluation Instruments ($20.00).

Developed by the Skyline Career Development Center in Dallas, Texas, these materials are aimed at competency-based education. In the 35 student learning plans, performance objectives, learning activities, and references are specified. There are learning plans or modules that cover most drafting topics, including applied geometry, dimensioning, gears and cams, fasteners, revolutions, piping drafting, electrical drafting, and welding drafting. The teacher implementation plan and evaluation instruments supply information, guidelines and materials for the instructor to use. Complimentary sample materials are available upon request.

Curriculum for Careers: Pattern Drafting. Harper and Row, 1976. Student Learning Plans ($4.95), Teacher Implementation Plan ($25.00), Evaluation Instruments ($20.00).

These materials follow the same format as the Technical Drafting series by Harper and Row, but cover pattern drafting topics. Complimentary sample materials are available upon request.

Curriculum Guide for Drafting. Industrial Education Department, University of Maryland, 1974, complimentary.

This guide contains course outlines for drafting courses offered in the Industrial Education Department at the University of Maryland. Prerequisites, behavioral objectives, topical course outline, and supplies are specified.

Curriculum Guide for Drafting by L. Schultheis and A. Seward. Baltimore City Public Schools, Vocational Education Area, 1975. Complimentary to Maryland educators.

This curriculum guide outlines a three-year drafting program, with content areas broken down into six semesters. For each area, behavioral objectives, skill development activities, related knowledge, and references are given. Areas covered include geometric construction, lettering, orthographic drawing, oblique drawing, isometric drawing, perspective drawing, production illustration, auxiliary drawing, charts, developments and intersections, sections, cams and gears, threads and fasteners, detail and assembly drawings, pipe drawing, electrical drawing, topography, structural drawing, and architectural drawing. HIGHLY RECOMMENDED.

Curriculum Guide for Vocational Architectural Drafting. Chicago Board of Education, 1968, 259 pp., $3.50.

Compiled by teachers and supervisors, this guide is designed to present ways of implementing methods and techniques of teaching architectural drafting. The four major divisions cover construction details, residential architectural drawing, presentation drawings, and intermediate building design. Suggested learning experiences and resources are included for each unit.

Curriculum Guide for Vocational Machine Drafting. Chicago Board of Education, 1968, 319 pp., $4.50.

Outlining a two-year program, this guide covers such areas as sketching, technical illustration, design, and functional drafting. Learning experiences and resource materials are specified.

Designing Essay, Objective, and Performance Tests. Vocational Instructional Services, Texas A & M University, $1.70.

This book contains information about testing student achievement in vocational education. Examples of tests covering a variety of trade areas are included. This resource can be used to prepare both standardized and informal teacher-made tests.

Directory of Task Inventories. The Center for Vocational Education, The Ohio State University. Volume 1, 1974, 49 pp., $4.00; Volume 2, 1975, 99 pp., $7.00; Volume 3, 1976, 98 pp., $6.25.

A compiled listing of available task inventories/analyses, these books are of value to curriculum developers, training directors, personnel officers, vocational teachers, and administrators. The information in these volumes was based on a review of documents from state, educational, and employment service agencies, curriculum laboratories, research coordinating units, the armed forces, private R & D agencies, and other organizations. Over 350 D.O.T. job titles are covered in these comprehensive references. HIGHLY RECOMMENDED.

Diversified Cooperative Training (DCT). Instructional Materials Laboratory, The Ohio State University, $4.40 per bound set.

This publication contains forty-five different training plans and progress records for use in cooperative work experience programs. One of the areas covered is drafting.

Drafting. West Virginia State Department of Education, 1973, 27 pp., $1.25.

This instructor's guide for secondary and adult education classes contains a two-year course outline divided into 16 units. A bibliography, equipment list, and suggested facility layout are included.

Drafting. Instructional Materials Laboratory, The Ohio State University, 1971, 66 pp., $3.00.

A complete suggested guideline for developing a program in drafting. The topics covered include a description of a drafting program, shop layout, equipment list, operating budget, course length, teacher salary, time schedule, course content, texts, references, and instructor's certification.

Drafting. Research and Curriculum Coordinating Unit, Mississippi State University, 1969, 80 pp., $1.50.

This teacher's guide for a first-year drafting course outlines fundamental knowledges and skills. There is also an extensive appendix of helpful items, plus a lesson plan, a job sheet, and an assignment sheet.

Drafting. New Mexico Department of Education, 1973, 27 pp., complimentary.

This teacher's course guide contains sections covering drafting careers, instruments and materials, lines, lettering systems, drawing reproduction, pictorial drawing, and orthographic projection.

Drafting. Oklahoma Curriculum and Instructional Materials Center, 1972, 644 pp., $15.00.

This curriculum guide of self-contained instructional materials is written in terms of student performance. It contains 13 units of instruction on orientation, plate information, lettering, sketching, major equipment, geometric construction, architect's scale usage, dimensioning procedures, orthographic projection, pictorial drawing, sectional views, and auxiliary views. Each unit contains behavioral objectives, suggested activities, transparency masters, assignment sheets, and tests and answer keys. Well worth the price. HIGHLY RECOMMENDED.

Drafting Course Outlines. Dade County Public Schools, 1972. Available from ERIC: ED 095 421, ED 095 422, ED 095 423, ED 095 424, ED 095 425, ED 095 426, ED 095 427.

Dade County Public Schools in Miami, Florida have developed an excellent set of drafting curriculum guides. All areas of drafting are covered including basic drafting, aeronautical drafting, electronic drafting, piping drafting, welding drafting, architectural drafting, and technical sketching. The seven guides are well-written and contain instructional units, references and posttests. HIGHLY RECOMMENDED.

Drafting I. Vocational-Technical Curriculum Laboratory, Rutgers University, 1970, 206 pp., $3.50.

This is an introductory drafting book. Information covered includes: reproduction processes; line conventions; basic drafting tools; lettering; dimensioning; orthographic projection; sectional views; fastening devices; screw threads; and pattern development. Objectives for each lesson are given, along with related information and assignments.

Drafting I - Instructor's Guide. Instructional Materials Laboratory, The University of Missouri-Columbia, 1972, 293 pp., $12.00; 108 transparencies, $44.00.

This instructional guide covers such topics as: basic tools and equipment; lettering; geometric construction; pictorial drawing; multiview drawing; dimensioning; sectional views; auxiliary views; working drawings; duplicating and inking drawings; shop processes; threads and fasteners; and intersections and developments. An instructional analysis of drafting, references, sources of instructional media, lesson plans, and unit tests are included. The transparencies are keyed to the lesson plans. HIGHLY RECOMMENDED.

Drafting - A First Year Course for the Comprehensive Secondary School. Vocational-Technical Curriculum Laboratory, Rutgers University, $3.00.

This exploratory book covers units in machine drawing, architectural drawing, pipe drawing, and electrical drawing.

Drafting: Study Guide and Unit Tests. Vocational Instructional Services, Texas A & M University, 1968, $4.00; Drafting Answer Book, 1968, $1.95.

This student guide is intended for use in a cooperative work experience training program, but can be used in a regular classroom situation. It contains 80 related assignments and a progress chart. An answer book is available to the teacher for evaluating work on the unit tests and drawing problems.

Drafting: A Suggested Course Outline. West Virginia State Department of Education, 1973, 27 pp., $1.25.

A two-year course of study in outline form is proposed to the drafting instructor. Included are references, tests, audio-visual materials, equipment, and a recommended shop layout.

Drafting Curriculum Guide. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.00.

This curriculum guide contains a job description, course description, recommended program of studies, and shop floor plan for designing a drafting course.

Drafting and Design Technology. Research and Curriculum Coordinating Unit, Mississippi State University, 1973, 124 pp., $4.50.

This publication contains a two-year curriculum for training drafting technicians. A two-column format shows the technical principles and the laboratory applications of the course content.

Drafting Employability Profile. Oswego County Board of Cooperative Education Services, 1 p., complimentary.

This one-page profile is used for an instructor's appraisal of a student's ability. It contains a list of operations and skills that students are expected to achieve. A section for evaluating the student's work habits, attitudes, and other characteristics is also provided. The form is similar to the Job Corps' Training Achievement Records, and is a good idea for record keeping and evaluation purposes. HIGHLY RECOMMENDED.

Drafting Individualized Learning Packages, Job Competencies, and Performance Objectives. Learn Fast Systems, 1974, 26 units, 100 lessons, 802 pp., $38.00 (discount for quantity orders).

This instructional program consists of 26 units that cover general drafting, advanced drafting, and architectural drafting. Each of the units contains several learning activity packages (LAPs). Each LAP consists of four parts: the rationale, performance objective, learning activity, and learning practice. Drafting job competencies and performance objectives are also available for an extra $15.00.

Drafting Learning Packets. Continuing Education Publications, 7 sets of packets for $41.25.

Oregon has developed individualized learning packets in seven areas of drafting. Each packet includes a behavioral objective, activities, and a test. Packets can be bought separately. Areas covered include: two units on basic drafting ($7.25 and $4.25); electronics drafting ($4.75); technical illustration ($4.25); descriptive geometry ($4.25); blueprint reading ($4.25); and architectural drafting ($9.00). An instructor's guide covering all areas is available for $3.25. Thirty-five cassette tapes that cover important basic concepts can be purchased for student or teacher use for $4.00 each or $122.00 for the set. Twenty-six video tapes are also available. Write Continuing Education Publications for further information. HIGHLY RECOMMENDED.

Drafting Task Listing and Objectives. Carroll County Public Schools, 1976. Complimentary to Maryland Educators.

Task details and behavioral objectives are listed on these sheets. A series of the sheets are kept in a student folder and are used for instructional, evaluative, and record keeping purposes. Upon completion of the course, the student keeps the folder and can use it to show prospective employers the competencies he or she possesses.

Drafting Technology Learning System. Xerox Learning Systems. Write for price.

Xerox Learning Systems are self-contained, self-paced, individualized audiovisual courses. Upon completion of the drafting course, the student is expected to possess the job-entry skills of a draftsman. The modules include an instructor's manual, audiovisual presentations, and classroom kits which serve as both a student work station and storage unit. There are 10 separate modules available covering an overview of drafting, instruments, orthographic projection, basic techniques, sectional and auxiliary views, dimensioning, tolerances, drawing format, and lettering. Write Xerox for further information, including cost.

Employability Profiles Manual. Nassau County BOCES, Division of Occupational Education, 1973, 262 pp., complimentary.

This manual contains employability profiles for most vocational education subjects. Each profile contains a skills listing and a section on attitudes, behaviors and work traits. The architectural draftsman's profile contains 37 skills, and the trade draftsman's profile lists 65 skills. HIGHLY RECOMMENDED.

Exploratory Drafting Booklets. Vocational-Technical Curriculum Laboratory, Rutgers University, 1971, $1.75.

This is a series of ten booklets designed for beginning students who will explore various trades at the beginning of their vocational training. Each booklet contains three units: basic drafting tools, basic blueprint reading, and drafting related to a specific trade area. Trade areas which the booklets cover include auto body repair, auto mechanics, carpentry, electronics, machine shop, and printing.

General Drafting Course Outline. Vocational Instructional Services, Texas A & M University, 1975, $1.70.

This outline details tasks and related information for drafting. The outline has been developed according to the block progression method of teaching. Suggestions for teaching, references, and aids are given.

General Drafting Graphics System (GDGS) User's Manual. Oklahoma Curriculum and Instructional Materials Center, 1975, $4.00.

The General Drafting Graphics System (GDGS) is a problem-oriented programming system. It allows technicians without prior computer experience to solve various engineering-related graphics problems using basic coordinate generating and plot generating features. Units of instruction have been developed in the following areas: GDGS commands; operating instructions and input deck sequence; input format (control and command cards); command descriptions; and GDGS error messages.

Graphics Underlay Guides: Scale Drawing by R. Nicyper. Graphicraft, 148 pp., $14.50.

Scale Drawing contains time-saving graphic underlays of different scales, objects, and grids. Axonometric and perspective grids, floor plan layout kits, and graphic data charts are among the aids included. HIGHLY RECOMMENDED.

Handbook of Performance Testing: A Practical Guide for Test Makers by J. L. Boyd, Jr. and B. Shimberg. Educational Testing Service, 1971, 182 pp. Available from ERIC: ED 052 220.

Intended for the classroom teacher, this handbook is an excellent source for instructors who would like to develop and use performance or skill testing. Examples, case studies, and practical guidelines are given to aid the teacher in developing tests. Examples of performance tests for metal body repairman, offset press operator, and machinist are included.

How to Write an Instructional Package. EDU-PAC of Minnesota, 1975, 36 pp., $3.50.

This learning activity package is designed for educators, curriculum specialists, coordinators, teachers, and anyone concerned with the educational process and the development of individualized instructional programs. The booklet shows how to develop and write a self-instructional package for any subject area.

Individualization and Modularization of Vocational Education Instructional Materials: An Annotated Bibliography of Publications and Projects by J. H. Magisos and A. E. Stakelon. The Center for Vocational Education, The Ohio State University, 1975, 55 pp., $4.00.

This bibliographical publication lists documents, journal articles, and current projects related to individualization and modularization of vocational education instructional materials. Most documents listed are available in microfiche or paper copy from the ERIC Document Reproduction Service or the original source.

Introduction to Geometric Dimensioning and Tolerancing. Vocational-Technical Curriculum Laboratory, Rutgers University, $2.00.

An introductory text for advanced students of machine drafting this book contains three units of study: basic definitions and symbols; tolerances of form; and tolerances of position. There are 32 illustrative problems throughout the book. Conversion and comparison tables are given in a separate appendix.

The Manual of Modern Drafting Practices. Technology Marketing Operation, General Electric Co., 1975, 580 pp., $95.00 ($40.00 per year for updating if desired).

The Manual of Modern Drafting Practices is a comprehensive drafting standards book. Published in loose-leaf form, the manual has 14 sections that cover such areas as forms, dimensioning, electrical drafting practices, and graphic symbols. Numerous illustrations convey the standards. Sets of added and revised sections are issued every six months at an additional charge. Developed following guidelines from the American National Standards Institute, this is a valuable reference for the teacher and student. HIGHLY RECOMMENDED.

Math, Blueprint Reading, and Measuring Tools. Oklahoma Curriculum and Instructional Materials Center, 1975, $3.50.

This is a student workbook developed for teaching the basic principles of math and blueprint reading.

Mechanical Drafting. Instructional Materials Laboratory, The Ohio State University, 15 pp., complimentary.

This course outline in mechanical drafting lists the basic instructional units of a beginning drafting course. For use by the instructor, this guide gives related information and industrial processes which are of importance to the draftsman. A bibliography of useful books is included.

Mechanical Drafting Objectives. Instructional Objectives Exchange, $8.00.

These 85 performance or amplified objectives cover basic drafting skills, lettering, orthographic projection, dimensioning, scale drawing, pictorial drawing, sectional drawing, auxiliary views, thread convention and symbols, and assembly and detail drawings.

Mechanical Draftsman. Instructional Materials Center, The University of Texas at Austin, 1975. Student's Manual, $14.50; Coordinator's Guide, $7.00.

The student's manual contains 29 written assignments covering drafting careers, equipment, general mathematics and geometry used in drafting, basic drawing and lettering techniques, orthographic projection, pictorial drawing, machine drafting, sheet metal drafting, building trades drafting, systems drafting, and special drawings. Although it is intended to be used in a cooperative work experience program, the manual is a good general study guide. The coordinator's guide contains assignment tests, work sheets to match related instruction to job experience, and answers to the assignments. HIGHLY RECOMMENDED.

Mechanical Drawing Instructional Materials. Charles Quinlan Publisher.

Charles Quinlan distributes a variety of instructional materials for the drafting teacher. Orthographic projection sheets and tests, visualization problems, lettering sheets, and isometric sketching problems are among these materials. Write for their catalog. HIGHLY RECOMMENDED.

Metrication Reference Manual by H. L. Riess. TAD Products, 39 pp., $9.50.

This loose-leaf book contains general information about metrication, in addition to instructions on how to convert to the system.

Metric Education: An Annotated Bibliography for Vocational, Technical, and Adult Education. The Center for Vocational Education, The Ohio State University, 1975, 154 pp., $10.00.

Over 350 metric instructional and reference materials are listed in this publication. Information about content, instructional strategies, educational level, and price is included for each.

Metrics. Instructional Materials Laboratory, University of Missouri-Columbia, $14.50.

This is a basic instructional kit for teaching metrics. The kit includes six sets of transparency masters covering the following areas: introduction to metrics; linear; linear to square; square to cubic to volume; volume to mass; luminous intensity; electric current; temperature; amount; and time. Each set includes basic subject matter, numerous worksheets, and student exercises.

Military Occupational Data Bank Questionnaire for Construction Draftsman. U. S. Army Military Personnel Center, complimentary.

This task inventory questionnaire booklet can be used as a reference for anyone attempting to conduct a task analysis of drafting. Sections on background information, tasks, equipment, and special requirements are included.

Model Machine Shop for Drafting Instruction by C. R. Jackson. Research Coordinating Unit, New Hampshire State Department of Education, 1974, 38 pp., complimentary.

This booklet reports on an approach to integrate machine shop practices with the drafting curriculum. A program of instruction is discussed, along with case histories of students, equipment needed, behavioral objectives, and evaluation techniques.

Modular Exploration of Technology Series: Construction and Communication Clusters. Five books, Prentice-Hall, 1976, 120 pp., $2.40 each.

The Modular Exploration of Technology Series (METS) provides brief, exploratory paperbacks in four occupational clusters: energy and transportation; construction; manufacturing; and communication. The construction cluster and communication cluster have books that cover drafting topics. The construction series contains four books dealing with careers, the construction industry, construction techniques, architectural drawing, and systems and materials. The communication series contains one book on drafting which covers tools, sketching, geometric constructions, lettering, dimensioning, working drawings, sectional views, auxiliary views, and pictorial drawings. Each unit in the books lists behavioral objectives and contains learning activities to be performed by the student.

Minneapolis Competency-Based Courses: Architectural Drafting; Electrical Drafting I; Engineering Drafting I; Introduction to Drafting; Machine Drafting I; and Mechanical Drafting I. Minneapolis Public Schools.

Each of these competency-based occupational courses contains a set of objectives, instructional units, a list of resource materials, and a student outcome/evaluation profile sheet. The units are designed to improve the articulation between secondary and post-secondary programs. Write for price and availability.

National Annotated Bibliography of Curriculum Materials in Vocational and Career Education. East Central Curriculum Management Center, 1974, 416 pp., complimentary loan.

This bibliography is the result of a nationwide search for instructional materials in the areas of occupational and career education. Most of the annotations cover state curriculum guides and contain descriptions of the material, prices, and a listing of where copies can be obtained. This is a good source of information for teachers, curriculum specialists, and administrators, but some of the materials are out-of-date or hard to obtain.

National Apprenticeship and Training Standards for Draftsmen. U. S. Department of Labor, Manpower Administration, 1972, 22 pp., complimentary.

The revised national standards for training draftsmen encompass standards for draftsmen in the manufacturing, marine, and architectural fields. The manufacturing draftsman training covers such areas as tracing, detailing, assembly drawings, and machine shop practices. The marine draftsman studies sheet metal, shipfitting, pipefitting, electrical drafting, descriptive geometry, and marine engineering. The architectural draftsman takes courses in technical illustration, drafting, and engineering mathematics. Information about standards for qualifications of apprenticeship, selection of apprentices, examinations, wages, and the ratio of apprentices to journeymen is also included.

Occupational Training Guides. Job Corps, Manpower Administration, 1974, 201 pp., complimentary.

A complete reference set of training guides is contained in this source. These guides provide training staff with a ready-reference of the minimum job entry-level requirements of training programs offered by Job Corps. Also included are references concerning employment data to assist staff in developing, implementing, and evaluating programs. The training guides list training elements, proficiency levels, education and technical knowledge, a job physical profile, and attitude and professional ethics. HIGHLY RECOMMENDED.

Performance Objectives Development Project. Michigan Department of Education, Vocational-Technical Education Service, 1974. Write for price.

Michigan has developed a set of performance objectives dealing with the drafting occupations. The objectives cover such areas as sketching, sectional views, and detailed drawings. A comprehensive set of objectives has been developed for architectural technology. Over 100 sets of objectives covering other vocational areas were also written.

Planning and Equipping School Shops for Trade and Industrial Education. Research and Curriculum Coordinating Unit, Mississippi State University, 1969, 112 pp., $3.50.

This publication contains detailed floor plans for most vocational shops, including a drafting lab.

Post-Secondary Vocational Industrial Drafting. Research and Curriculum Coordinating Unit, Mississippi State University, 1971, 101 pp., $3.00.

This is an instructor's guide which covers operations, skills, and knowledges for a two-year drafting program. The course outline for the first year covers the fundamentals of drafting. The second year goes into advanced machine, architectural, topographical, and structural drafting. A recommended text is included in the bibliography, along with suggested references. The appendix includes jobs, progress chart, operations analysis, shop layout, and examples of instructional sheets.

Printed Circuit Design and Drafting by J. S. Cook. TAD Products, 214 pp., $18.50.

This is a programmed instruction book for a course in printed circuit design and drafting. Each chapter is arranged in a series of numbered frames containing progressive amounts of information and questions. The book covers artwork, photography, etching, and plating.

Proceedings of a Symposium on Task Analyses/Task Inventories by P. Schroeder. The Center for Vocational Education, The Ohio State University, 1976, 137 pp., $9.75.

Papers that were delivered at a symposium on task analyses/ inventories are contained in this book. Processes and techniques on how to conduct and use task analyses are described.

Programmed Graphics by W. Schneerer. McGraw-Hill, 1967, 550 pp., $11.95; Teacher's Manual, $1.50.

Designed for programmed instruction, this textbook covers orthographic projection, pictorial drawing, drafting standards, descriptive geometry, and graphic mathematics. The teacher's manual contains answers to the exercises.

Programmed Learning and Individually Paced Instruction Bibliography by C. H. Hendershot. Hendershot Programmed Learning, 1975, $50.00.

Included in this loose-leaf bibliography are descriptions of programmed instructional materials in vocational areas, including drafting.

Project CAREER (Computer Assisted Research for Education Relevance) Performance Objectives and Task Outlines. Massachusetts Department of Education. Complimentary materials upon request.

Project CAREER is a federally-funded research and development grant administered by the Division of Occupational Education, Massachusetts Department of Education. As part of the project's activities, a computerized data bank of occupational performance objectives has been developed for over 120 occupational areas, including drafting. For each objective, the following elements are included: necessary prerequisite competencies; component skills or procedures for attaining the target objectives; environmental variations within and/or through which to learn the objectives; and related concepts which can be taught in conjunction with the objectives. There is also a coding process which identifies those objectives which can be performed by certain classes of handicapped students. Task outlines have been written for a draftsman (D.O.T. 017.281) and commercial artist and technical illustrator (D.O.T. 143.062). Although designed for Massachusetts educators, sample materials can be obtained.

Ohio Trade and Industrial Education Achievement Test in Mechanical Drafting. Instructional Materials Laboratory, The Ohio State University, 1963.

The Ohio Achievement Test Battery is a series of tests in several trade and industrial areas. The purpose of the tests is to aid teachers, supervisors, and administrators in evaluating and diagnosing vocational achievement. The Ohio State Department of Education offers the testing service as a total package. Test booklets are not for sale, nor are they released for review. The mechanical drafting test consists of 250 items covering eighteen units including such areas as dimensioning, auxiliary views, and machine elements. For further details, write the Instructional Materials Laboratory.

Related Drawing - Building Construction. Vocational-Technical Curriculum Laboratory, Rutgers University, 1973, 20 pp., $1.00.

Related Drawing - Building Construction is a one-year course outline for the teacher of related drawing. It can be used in building construction or drafting classes. Written in behavioral terms, it covers the following topics: how drawings are reproduced; tools for dimensioning; working drawings; sketching; placement of views; invisible edges; structural members; one-car frame garage construction; two-car brick garage construction; drawing instruments; and topography and building location.

Research and Development Projects in Vocational Education and U. S. Office of Education Curriculum Development Projects, U. S. Office of Education, Division of Occupational and Adult Education, complimentary.

These two listings are issued each fiscal year by the U. S. Office of Education. They indicate the research and development projects and curriculum projects that have been funded by USOE for the current year. Especially valuable to those involved in research and curriculum development.

Research in Industrial Education: Retrieval of Data from Information Systems by D. L. Jelden. American Industrial Arts Association, 52 pp., 1976, $2.00.

This monograph offers brief explanations of some of the prominent data systems and information resources from which vocational-technical educators can obtain information. It is written for the classroom teacher who wants to find information in a quick and effective way. Such systems as DATRIX, the National Technical Information Service, the Educational Resource Information Center (ERIC), and Abstracts of Instructional and Research Materials in Vocational and Technical Education (AIM/ARM) are discussed. HIGHLY RECOMMENDED.

Safety. Vocational Education Media Center, Clemson University, 1968, 39 pp., $1.25.

This guide has been prepared to aid teachers in conducting an effective program of safety instruction. The text contains general information on safety responsibilities, first aid, teacher liability, specific shop and lab rules, a transparency list, and other related information. A set of 31 safety transparency masters are available for $3.00.

Safety: Interpretation of O.S.H.A. for Industrial Education. American Council of Industrial Arts Supervisors, 1975, 118 pp., $3.00.

This monograph conveys the safety regulations that must be followed by industrial education teachers in order to be in compliance with the Occupational Safety and Health Act (OSHA). General safety, labeling standards, color coding, and occupational safety and health standards are covered.

Sanford Research Project: Drafting Learning Activity Packages, Drafting Competencies, and Performance Objectives. Sanford Central High School, 1974. Complimentary samples upon request. Also available from ERIC: ED 106 651, ED 107 832, ED 107 833, ED 107 834.

The Sanford Research Project focused upon the development of individualized instructional materials for vocational education programs offered at Sanford Central High School in North Carolina. Career competencies, performance objectives, and individualized learning activity packages (LAPs) were completed for many occupational areas, including drafting. There is a unit package for each drafting topic which contains required prerequisites, rationale for the unit, and general objectives of the unit. Specific performance objectives, learning activities, and learning practices are specified in LAPs covering each task. A list of 36 architectural drafting competencies and 74 mechanical drafting competencies were developed by this project. HIGHLY RECOMMENDED.

Secondary Vocational Industrial Drafting: A Teacher's Outline for Use in the Organization and Management of Instruction. Research and Curriculum Coordinating Unit, Mississippi State University, 1971, 81 pp., $2.50.

This teacher's guide contains a course outline for a two-year drafting program. The program is broken down into fundamentals of drafting, machine drafting, advanced machine drafting, and architectural drafting. The appendix contains suggested jobs, progress charts, operations analysis, a lab layout, a supply listing, and examples of instructional sheets.

Shop Layouts and Equipment Lists. Tennessee Vocational Curriculum

Laboratory, 1971, 155 pp., $3.00.

This publication contains suggested shop layouts and equipment lists for a variety of trades, including appliance repair, auto body, auto mechanics, drafting, electricity, carpentry, machine shop, printing, and radio and television service.

Standards and Formats for Vocational-Industrial Instructional Materials. Vocational Instructional Services. Texas A & M University, $2.85.

This publication shows the relationship of various types of instructional sheets and aids, the origin of each, and how each contributes to the teaching of a complete lesson.

Structural Drawing Manual. Vocational-Technical Curriculum Laboratory, Rutgers University, 1968, 178 pp., $2.00.

This manual was prepared to meet the requirements of drafting technicians and structural draftsmen. It covers the duties of a structural draftsman in the preparation of detailed working drawings for steel and concrete structures. It is recommended that the Manual of Steel Construction be used in conjunction with this manual. The presentation is divided into four chapters: foundation construction; structural steel columns and walks; steel beams and trusses; and roofing materials and construction.

Student Competency Sheets in Drafting. West Virginia Vocational Curriculum Laboratory, 1976.

These drafting competency sheets were developed for use in a new vocational school, Boone County Career Center in West Virginia. Designed to promote individualized competency-based instruction, each sheet contains a performance objective, learning activities, and an evaluation section. Write the West Virginia Vocational Curriculum Laboratory for details about price and availability. HIGHLY RECOMMENDED.

Survey of Manpower Needs for Drafting Technicians. Brunning, 1974, 4 pp., complimentary.

As a result of a survey of 610 employers, Brunning has published this drafting manpower and curriculum summary report. This is a good source of information for teachers.

Task Analysis Inventories: A Method for Collecting Job Information. U. S. Department of Labor, Manpower Administration, 1973, 201 pp. Available from the U. S. Government Printing Office, $2.60.

The inventories in this publication were developed in accordance with the Handbook for Analyzing Jobs. Most of the inventories are general and should be supplemented with in-depth job studies. Seventy tasks are listed for the area of architectural, engineering, and related occupations.

Technical Drawing: An Applied Study - First Year. Vocational-Technical Curriculum Laboratory, Rutgers University, 1968, 259 pp., $3.50.

This is an instructional workbook to be used in conjunction with any standard text. It covers drafting room orientation, introduction to drawing, multiview sketching and projection, working drawing interpretation, sections and related conventions, and isometric drawing. Most units have five lessons. Detailed assignments with full drawing instructions are included.

Technical Graphics. Vocational-Technical Curriculum Laboratory, Rutgers University, 1971, 295 pp., $3.50.

This book covers descriptive geometry with chapters on geometric constructions; orthographic projection; points, lines, planes, and solids; shortest distances; intersections; definitions; and area formulas. Good illustrations and problems are contained throughout the book. HIGHLY RECOMMENDED.

Time-Free, Modular, Competency-Based Drafting Curriculum. Link Educational Laboratories, 1973, $12.50.

These five booklets contain modules (booklets) on different drafting topics. Each module contains detailed performance objectives and competency tests for different levels of proficiency. Equipment, geometric constructions, dimensioning, orthographic projection, isometric drawing, oblique drawing, sectional views, and auxiliary views are the areas covered. For each objective, learning activities and materials are specified. The last booklet contains a list of instructional resources.

TIMES Project (Temporally Individualized Modular Education Scheduling). Admiral Peary Area Vocational-Technical School. Complimentary sample materials upon request.

The main goal of this project was to develop a computerized system for coordinating occupations listed in The Dictionary of Occupational Titles with educational modules in each vocational area of instruction. The study was conducted by the Admiral Peary Vocational-Technical School in Pennsylvania for their 20 programs, one of which is mechanical drafting and design technology. Program study sheets were developed which contain occupational descriptions, a list of potential local employers, a list of required tasks, and other elective and career-tasks that should be completed. These sheets are used by the individual instructor to develop task instruction sheets which contain the major task learning objectives, background information, procedures, materials and supplies, safety precautions, review questions, and references. The TIMES concept is currently being utilized at Admiral Peary and it appears to be a highly individualized and flexible program of instruction. The program is performance-based, open-entry/open-exit, and modular to allow a student to progress at his or her own rate. HIGHLY RECOMMENDED.

Trade and Industrial Education Course of Study for Mechanical Drafting. Pennsylvania Department of Education, 1975, 386 pp., complimentary.

This course of study contains general course objectives, a course outline, job sheets, and operation sheets. The job and operation sheets, which are keyed to Technical Drawing by Giesecke, Mitchell, Spencer and Hill, are well done. Content areas covered include instruments, geometric construction, multiview projection, freehand sketching, reproduction and control of drawings, sectional views, auxiliary views, revolutions, axonometric drawing, and oblique drawing. HIGHLY RECOMMENDED.

Trade and Industrial Education Resource Materials by R. Lambert, F. Holman, and B. Ross-Thomson. The Center for Studies in Vocational and Technical Education, University of Wisconsin-Madison, 1975, 22 pp., $1.50.

A comprehensive bibliography of non-commercial resource materials, this booklet lists study guides, reference materials, teaching aids, course outlines, learning activity packages, and curriculum materials. Although intended to be used as a listing of materials for a free loan system in Wisconsin, the bibliography is a good reference since it contains resources which are available nationwide. HIGHLY RECOMMENDED.

Trade Preparatory Training Guide: Drafting. Nebraska State Department of Education, 25 pp. Also available from the Task Inventory Exchange, The Center for Vocational Education, $1.35.

This booklet contains a listing of 66 drafting tasks which are deemed necessary for entry-level employment.

Training Achievement Records. Job Corps, Manpower Administration, 1974, complimentary.

This booklet contains 144 training achievement records which are to be used in conjunction with the Job Corps' Occupational Training Guides for record keeping purposes. The forms include information about the student's educational and technical knowledge, job physical profile, attitudes and professional ethics, and proficiency levels. HIGHLY RECOMMENDED.

Vocational Drafting. Utah State Board of Vocational Education, 1973, 133 pp., complimentary.

This manual was developed to improve curriculum articulation between high school and post-high school vocational drafting programs. It provides instructors with behavioral objectives by which students can be evaluated upon completion of each unit.

Vocational Drafting Performance Skills Profile. New Hampshire Department of Education, 1975, 1 p., complimentary.

This one-page profile is a record keeping instrument which can be used to record an individual's proficiency in drafting. Content areas with lists of tasks are provided, along with a key for indicating a person's proficiency level. A section on work habits is also included.

Vocational Education State Instructional Materials for Trade and Industrial Occupations. Oklahoma Curriculum and Instructional Materials Center, 1974, 72 pp. Available from the U. S. Government Printing Office, $1.20.

This annotated listing indicates available curriculum materials from various state education agencies. This booklet is a good source of information, but some materials are out-of-print or hard to obtain.

Vocational Related Math. Oklahoma Curriculum and Instructional Materials Center, 1972, 908 pp., $12.00.

This curriculum guide covers seven areas, each consisting of one or more units of instruction. Each unit includes behavioral objectives, suggested activities, information and assignment sheets, visual aids, tests, and answer keys. A total of 39 units of instruction covers such areas as measurement, whole numbers, fractions, decimals, percent, consumer education, and geometry. HIGHLY RECOMMENDED.

Vocational Technical Drawing: Books 1 - 6. Vocational Curriculum Development and Research Center, Natchitoches, Louisiana, 1966.

These six books contain information and job sheets relating to most areas in drafting. Lettering, geometric construction, dimensioning, multiview drawing, auxiliary views, sectional views, precision dimensioning, screw threads and fasteners, gears and cams, pictorial drawing, technical sketching, welding drawing, architectural drawing, plumbing and piping drawing, and topographic drawing are covered. These books are very comprehensive and are supplemented with excellent illustrations. Write the Center for prices.

Vocational-Technical Education Consortium of States (V-TECS) Curriculum Project. Vocational-Technical Education Consortium of States.

An extensive and comprehensive curriculum project is currently being carried out by member states of the Vocational-Technical Education Consortium of States (V-TECS). V-TECS was formed in 1973, with its fundamental purpose to develop catalogs of performance objectives and criterion-referenced measures in occupational education. V-TECS is developing objectives based upon a uniform procedure consisting of: 1) development of task statement booklets by a domain of job titles; 2) selection of a representative random sample of incumbent workers; 3) administration of the task statement booklets to the incumbent worker sample; 4) computerized analysis of information collected from the sample in terms of time spent on tasks, difficulty of tasks, etc.; 5) conversion of the task statements into performance objectives with companion criterion-referenced measures; and 6) a comprehensive field test and dissemination program. Each state is required to develop at least two areas in occupational education. Catalogs and materials will be initially shared by the consortium members, and eventually placed in ERIC.

Indiana has developed a state-of-the-art report, performance objectives, and criterion-referenced measures for drafting. For information about V-TECS materials, Maryland educators should contact Mr. William Michel at the Maryland State Department of Education. HIGHLY RECOMMENDED.

Vocational-Technical Learning Materials by B. Reinhart.
Bro-Dart Publishing Co., 1974, 307 pp., $35.00.

There are over 5,000 books and journals briefly annotated in this comprehensive listing. Prices and grade levels are indicated. A rating system is used to show which sources should be acquired first. Sources are critically annotated, indicating strengths and weaknesses of each entry. Slightly out-of-date but a good reference.

What's New for Industrial Arts/Vocational Education Teachers.
Co-op Mailings, complimentary.

Published semi-annually, this booklet contains postage-free business reply cards about products and materials related to industrial arts and vocational education. Sent free to those who are on the mailing list, this source is an easy way to obtain information about new instructional aids and equipment.

Writing, Teaching and Supplementing a Unit of Instruction.
Oklahoma Curriculum and Instructional Materials Center, 1975, 98 pp., $2.25.

This publication is designed to enable the instructor to write a unit of instruction. The manual explains how to teach and supplement units based on performance objectives, and develop content needed in order to reach the stated objectives.

BOOKS

There are many commercial books available in drafting. To list all of these books would take many pages and would merely be repetitious of what can already be found in other references. The following references are those which can be useful in the location of commercial texts.

Books for Occupational Education Programs: A List for Community Colleges, Technical Institutes and Vocational Schools by E. Mapp. R. R. Bowker Co., 1971, P. O. Box 1807, Ann Arbor, Michigan 48106, 308 pages, $35.00.

This source contains a listing of trade books, references, handbooks, texts, and curriculum guides dealing with occupational education programs. Although the entries are not annotated, the book is comprehensive and each category is broken down into specialized areas. However, since the text was published in 1971, it is a little outdated.

Books in Print ($70 annual edition; $35 supplements) Paperbound Books in Print ($55 annual edition), R. R. Bowker Co., P. O. Box 1807, Ann Arbor, Michigan 48106.

These annual publications provide a comprehensive listing of all the books that are still being published by commercial companies. Books are listed according to subject and author, with the price, pages, and publisher given. All public libraries will have a copy of these references.

BOOK PUBLISHERS

The following is a selected list of publishers of drafting books. These publishers issue annual catalogs containing descriptions of their books. If possible, it would be advisable for educators to be placed on their mailing lists in order to keep informed of current and up-coming drafting publications. It is best to evaluate any book before purchasing. Examination copies can be obtained from most publishers by requesting them on school stationery.

Allyn and Bacon
Rockleigh, New Jersey 07647

American Technical Society
848 East 58th Street
Chicago, Illinois 60637

Architectural Book Publishing Co.
10 East 40th Street
New York, New York 10016

Arco Publishing Company
219 Park Avenue South
New York, New York 10003

Chas. A. Bennett Company
809 West Detweiller Drive
Peoria, Illinois 61614

Bruce Publishing Company
866 Third Avenue
New York, New York 55415

Delmar Publishers
Mountainview Avenue
Albany, New York 12205

Goodheart-Willcox Company
123 West Taft Drive
South Holland, Illinois 60473

Gulf Publishing Company
P. O. Box 2808
Houston, Texas 77001

Harcourt Brace Jovanovich
757 Third Avenue
New York, New York 10017

Harper and Row Publishers
10 East 53rd Street
New York, New York 10022

Hayden Book Company
50 Essex Street
Rochelle Park, New Jersey 07662

Houghton Mifflin Company
1 Beacon Street
Boston, Massachusetts 02107

The Macmillan Company
866 Third Avenue
New York, New York 10022

McGraw-Hill Book Company
Princeton Road
Hightstown, New Jersey 08520

McKnight Publishing Company
P.O. Box 854
Bloomington, Illinois 61701

National Learning Corporation
212 Michael Drive
Syosset, New York 11791

Prakken Publications
416 Longshore Drive
Box 627
Ann Arbor, Michigan 48107

Prentice-Hall
Educational Book Division
Englewood Cliffs, New Jersey 07632

Howard W. Sams Company
ITT Educational Publishing
4300 West 62nd Street
Indianapolis, Indiana 46206

Van Nostrand Reinhold Company
300 Pike Street
Cincinnati, Ohio 45202

Whitney Library of Design
One Astor Plaza
New York, New York 10036

John Wiley and Sons
605 Third Avenue
New York, New York 10016

PERIODICALS AND JOURNALS

Periodicals and journals can be a valuable source of information for the classroom teacher. The following is a list of periodicals related to the fields in drafting. One should examine this list to pinpoint publications which can be of use for instructional and research purposes.

AIA Journal. Monthly. American Institute of Architects, 1735 New York Avenue, N. W., Washington, D. C. 20006. Qualified personnel, $12.00 a year; others $18.00 a year.

American Vocational Journal. Monthly. American Vocational Association, 1510 H Street, N. W., Washington, D.C. 20005. $8.00 a year.

Architectural Record. Monthly. McGraw-Hill Inc., 1221 Avenue of the Americas, New York, New York 10020. $12.00 a year.

Design Engineering. Monthly. Maclean-Hunter Ltd., 481 University Avenue, Toronto M52 IA7, Ontario, Canada. $12.00 a year.

Design and Environment. Quarterly. R. C. Publications, 19 West 44th Street, New York, New York 10036. $11.00 a year.

Design News. Fortnightly. Cahners Publishing Company, 221 Columbus Avenue, Boston, Massachusetts 00772. $20.00 a year.

Design Quarterly. Quarterly. Walker Art Center, Vineland Place, Minneapolis, Minnesota 55403. $5.00 a year.

Die Casting Engineer. Bi-monthly. Society of Die Casting Engineers, 16007 West 8 Mile Road, Detroit, Michigan 48235. $8.00 a year.

Engineering Design Graphics Journal. Three issues per year. Engineering Design Graphics Division, American Society for Engineering Education, One Dupont Circle, Washington, D.C. 20036. $5.00 a year.

Engineering Graphics. Monthly. St. Regis Publications, 25 West 45th Street, New York, New York 10036. (Available through Keuffel and Esser Company, 20 Whippany Road, Morristown, New Jersey 07960). Complimentary.

Graphic Science. Monthly. Whitney Enterprises, 30 East 40th Street, New York, New York 10016.

Graphics Today. Bi-monthly. Syndicate Magazines, 6 East 43rd Street, New York, New York 10017. $9.00 a year.

Guidelines Architectural Letter. Guidelines Publications, P.O. Box 456, Orinda, California 94563. $30.00 a year.

House and Home. Monthly. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020.

Industrial Design. 10/year. Whitney Publications, 18 East 50th Street, New York, New York 10022. $20.00 a year.

Industrial Education. Monthly. Macmillan Professional Magazines, One Fawcett Place, Greenwich, Connecticut 06830. $12.00 a year.

Interior Design. Monthly. Whitney Communications Corporation, Interior Design Division, 150 East 58th Street, New York, New York 10022. $14.00 a year.

The Kodak Compass. Quarterly. Eastman Kodak Company, Audio-Visual Library Distribution, 343 State Street, Rochester, New York 14650. Complimentary.

Land. Monthly. American Society of Landscape Architects, 1750 Old Meadow Road, McLean, Virginia 22101.

Man/Society/Technology. Monthly. American Industrial Arts Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036. $9.00 a year.

Machine Design. 31/year. Penton Publishing Company, Penton Plaza, Cleveland, Ohio 44114. $25.00 a year.

Mechanical Engineering. Monthly. American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017. $10.00 a year.

NASA Tech Briefs. Quarterly. National Aeronautics and Space Administration, Technology Utilization Office, P. O. Box 8756, Baltimore-Washington International Airport, Baltimore, Maryland 21240. Complimentary.

Plan and Print. Monthly. International Repro Graphic Blueprint Association, 10116 Franklin Ave., Franklin Park, Illinois 60131. $10.00 a year.

Product Engineering. Monthly. Morgan-Grampian, Inc., 205 East 42nd Street, New York, New York 10017.

Product Design and Development. Monthly. Chilton Company, Chestnut & 56th Street, Philadelphia, Pennsylvania 19139.

Professional Builder. Monthly. Cahners Publishing Company, c/o March P. Tumble, 5 South Wabash Avenue, Chicago, Illinois 60603.

Progressive Architecture. Monthly. Reinhold Publishing Company, 600 Summer Street, Stamford, Connecticut 06904. $7.00 a year.

Reprographics. Bimonthly. United Business Publications, 750 Third Ave., New York, New York 10017. $9.00 a year or complimentary to qualified personnel.

School Shop. Monthly. Prakken Publications, Box 623, 416 Longshore Drive, Ann Arbor, Michigan 48107. $10.00 a year.

Surveying and Mapping. Quarterly. American Congress of Surveying and Mapping, Box 470, Benjamin Franklin Station, Washington, D.C. 20005.

AUDIOVISUAL MATERIALS

The following sections contain 16mm films, filmstrips, filmloops, slides, transparencies, and other audiovisual media dealing with various aspects of drafting. The annotations were taken from literature supplied by film producers, distributors, and other sources. It is strongly advised that a preview copy be requested for evaluation before showing or purchasing any type of media. A preview copy can usually be obtained on a free loan basis or at a nominal cost.

Audiovisual presentations and written information by manufacturers should not be ignored. Many manufacturers of equipment, furniture, and materials produce short movies or similar audiovisual presentations. While promotional and commercial in nature, such media generally present good information, as well as provide students with a look at the latest technology. In addition, printed literature such as brochures and fact sheets is also available from manufacturers which could be used to supplement the media.

More information about the following media can be obtained by writing to the producer or distributor. Source addresses appear in the source listing located in the last section of this resource guide.

FILMS

The following are films listed in alphabetical order. All attempts have been made to include only current, available films. However, the reader should be aware that many films are deleted and added each year by film producers and distributors. Therefore, it is advisable to be placed on the mailing lists of selected film distributors to keep informed of the current status of their films.

The following should be observed when ordering films on a rental basis:

1. Use school stationery when requests are made.
2. Requests should be made well in advance, giving two alternate dates which would be satisfactory for your instructional schedule.

The Art of Generating Involute Gears. 25 min., color, Bay State Film Productions, complimentary loan.

> This film shows the involute curve as utilized in the design of gears to transmit motion. It illustrates the elements of gear tooth design and required equipment as applied to the production of gears.

Auxiliary Views: Double Auxiliaries. 13 min., b & w, McGraw-Hill Films, $10.00 (rental), $145.00 (purchase).

This film explains simple auxiliary views through three-dimensional techniques. It reviews orthographic projection and describes how to find the true shape of an object with one or more inclined surfaces. Also discussed are auxiliary elevations, right and left auxiliary views, and front and back auxiliary views. Can be used to complement the textbook, Engineering Drawing by French and Vierck.

Concepts and Principles of Functional Drafting. 20 min., b & w, TAD Products, $50.00 (rental), $195.00 (purchase). Also available from University of Minnesota, $4.65 (rental).

This film discusses how functional drafting techniques can save drafting time and make drawings easier to prepare and read. It is designed for both the new and experienced draftsman.

Creative Attitude. 27 min., color, General Motors, complimentary loan.

Outlines effective ways to spark new ideas in designing automobiles.

DAC-I (Design Augmented by Computers). 13 min., color, General Motors, complimentary loan.

This film shows how the computer can aid in the design and drafting of automobiles.

Drafting. Six 8mm films, Sterling Educational Films, $165.00 each.

These films cover various aspects of drafting. Areas covered are jobs in drafting ($90.00); drawing and planning; methods; lettering; drawing and planning for woodwork; and drawing and planning for metalwork.

Drafting: Occupations and Opportunities. 13 min., color, BFA, 1969, $9.00 (rental), $155.00 (purchase).

This film shows that drafting is the professional language of architects, engineers, and designers and that drafting offers many career possibilities. Drafting is stressed as a means to visual communication and a key to organized thinking and planning.

Drafting Methods. 12 min., color, University of Illinois, Visual Aids Service. Write for price.

This film discusses line techniques used in drafting.

The Draftsman-Surveyor. 29 min., color, University of Iowa, Audio-Visual Center, 1964, write for price.

Summarizes the work of a draftsman-surveyor in the field and at the drawing table.

Drawings and the Shop. 15 min., b & w, Indiana University, Audio-Visual Center, $6.75 (rental).

Describes the relationship between the making of a drawing and various production operations in the shop. Shows representative operations in the pattern shop, machine shop, and the assembly shop which depend upon the accuracy of the drawing.

Engineering America's Future. 14 min., color, Ideal Pictures Film Library, complimentary loan.

This film shows how drafting tools are made. During a tour of the Post Company plant in Owen, Wisconsin, the film shows the manufacture of drafting tools from rough-cut logs to the finished product. The use of the tools is also shown. (This film is available in Michigan and Wisconsin only.)

Essentials of Drafting. 23 min., color, Aims Instructional Media Services, $30.00 (rental), $315.00 (purchase).

A motion picture which introduces beginning students to proper techniques in the manipulation of drafting tools. The film is also available as three separate films. Topics include an introduction to drafting, T-square and triangle, and dividers and compass ($20.00 rental each).

Expression. 19 min., color, Association-Sterling Films and United States Steel Corp., complimentary loan.

This film shows the construction of the 64-story Pittsburgh Headquarters Building. It illustrates the work of the architect and structural engineer with regard to the design and building techniques.

Introduction to Engineering Drawing. 9 min., b & w, University of Illinois, Visual Aid Service. Write for price.

This film demonstrates the need for and importance of engineering drawing.

Jobs in Drafting. 8 min., color, Sterling Educational Films, 1970, $90.00.

This film shows the career opportunities open to beginning draftsmen. Young men and women are shown at work in a construction engineering firm. The film illustrates how their individual work assignments will finally result in the design and construction of a suspension bridge. The emphasis is on teamwork and the fact that apprentice draftsmen are being sought out and helped by employers to obtain the additional education needed to become designers and supervisors.

Language of Drawing. 11 min., b & w, McGraw-Hill Films. Also available from University of Minnesota, $2.40 (rental).

This film attempts to stimulate the beginning student's interest in mechanical drawing by showing the many jobs in factories, ship yards, laboratories, and shops that rely on the abilities of the draftsman.

Oblique Cones and Transition Developments. 11 min., b & w, McGraw-Hill Films, $10.00 (rental), $75.00 (purchase).

This film uses animated drawings to show the development of several complicated shapes. Transitions connecting a circular opening and two curved openings are developed. The use of true lengths diagrams and triangulation is demonstrated.

Orthographic Projection. 19 min., b & w, McGraw-Hill Films, 1965. Also available from Michigan State University, $5.25 (rental); Indiana University, $7.25 (rental); and McGraw-Hill Films, $12.00 (rental), $135.00 (purchase).

Using animated three-dimensional effects to simplify the mechanics and purposes of shape description, this film demonstrates the making and reading of a drawing using orthographic projection.

Pictorial Sketching. 11 min., b & w, McGraw-Hill Films, $10.00 (rental), $75.00 (purchase).

This film uses a combination of animation and live photography to cover the basic principles of pictorial sketching. It describes three methods commonly used -- anonometric, oblique, and perspective -- and explains where and how to use each method. The film can be used to complement the textbook Engineering Drawing by French and Vierck.

Principles of Scale Drawing. 10 min., b & w, Coronet Instructional Films. Also available from Michigan State University, $3.25 (rental).

This film shows the application of a scale drawing, methods for determining a scale, and the use of simple scaling tools. The understanding of terms and the importance of scale drawings in industry are points of emphasis.

Sections and Conventions. 15 min., b & w, McGraw-Hill Films, $10.00 (rental), $105.00 (purchase).

This film shows conventional principles and practices followed in constructing sectional views. Described are the various types of sections, including a full section, half-section, revolved section, and auxiliary section.

Shop Procedures. 17 min., b & w, McGraw-Hill Films, $10.00 (rental), $120.00 (purchase).

This film shows how mechanical drawings are used as detailed instructions in every step of manufacturing. The operation of basic machines is demonstrated, thus giving the student an overview of modern production methods.

Simple Developments. 11 min., b & w, McGraw-Hill Films, $10.00 (rental), $75.00 (purchase).

Animated drawings are used in this film to explain what simple developments are and how they are used. Step-by-step developments of a hexogonal prism, truncated cylinder, right rectangular pyramid, oblique pyramid, right circular cone, and truncated right circular cone are shown.

Size Description. 13 min., b & w, McGraw-Hill Films, $10.00 (rental), $90.00 (purchase).

This film shows how uniformity in dimensioning practice is essential. Shown are methods for describing complex drawings by breaking them down into simple geometric parts for dimensioning.

Three-Dimensional Drafting. 22 min., b & w, University of Illinois, Visual Aids Service. Write for price.

Compares three-dimensional or pictorial drafting with the conventional method and shows the many advantages of pictorial over flat plane or orthographic drawings.

Up from Clay. 26 min., color, General Motors, complimentary loan.

This film illustrates how cars are designed.

FILMSTRIPS, FILMLOOPS, AND SLIDES

Applied Graphics. 353 transparencies, $790.00; or 353 slides, $395.00, Gaskell Teaching Aids.

These visuals, which are part of the Gaskell Teaching Aids System, cover shop processes, screw threads and fasteners, limit dimensioning, working drawings, piping and welding, reproduction and special drafting equipment, architectural drawing, perspective drawing, and applications. Two texts that correlate with these visuals are also available: Architectural Drawing and Perspective Drawing ($1.60 each).

Architectural Drafting. 6 filmstrips with records or audio cassettes, Doubleday Multimedia, $125.00.

The student is acquainted with the basic skills needed to complete a set of working drawings for a residential structure. The filmstrips cover planning the house, floor plans, foundation plans and details, elevation drawings, plot plans, and architectural rendering.

Careers in Drafting. 2 filmstrips with audio cassettes, color, Career Aids, $45.00.

These filmstrips outline careers in architectural, structural, civil, and technical drafting. A teacher's guide is included.

Drafting Career Modules. Filmloops, 2 min., color, Hoffman Occupational Learning Systems, $11.95 each.

These filmloops are two-minute cassettes (also available in filmstrips) explaining drafting occupations, working conditions, salary ranges, and education and training requirements. There are several cassettes related to drafting in the Hoffman series.

Drafting-Series I & II. Two series of 5 filmstrips each with records or audio cassettes, Doubleday Multimedia, $20.50 each filmstrip, $82.50 for each series.

These sound filmstrips are designed to give the student needed working knowledge of major drafting skills. Series I covers lettering, sections, shape description, and size description. Series II covers auxiliary views, isometric drawing, developments, drawing and specifying screw threads, and assembly and detail drawings. Teaching guides are also included with each series.

Drawing and Planning. 25 filmloops, color, Sterling Educational Films, $22.00 each (silent); $30.00 each (sound).

Areas covered in this series of filmloops include: drawing tools; planning the project; drawing the project; planning accessories and finishes; lines, dimensions, symbols; drawing a straight line; alphabet of lines; sketching; isometric drawings; T-square and triangle; planning; sketching a circle; sketching an arc; making circles with compasses; making arcs with compasses; lettering; types of metalwork drawing and planning; drawing a pattern for sheet metal; sheet metal terms; shapes in sheet metal; and applying the pattern to the project.

Elementary Mechanical Drawing. 4 filmstrips with audio cassettes, b & w, ACI Films, $65.00.

These filmstrips cover the basics of mechanical drawing. A teacher's guide is included with this series.

Introduction to Technical Drawing. 5 filmloops, color, EBE, $22.00.

These filmloops show the preparation of materials and the steps necessary to render accurate drawings. Areas covered include: line making, curved lines, projection, straight lines, and the alphabet of lines. A teacher's guide accompanies each film.

Language of Technical Drawing. 5 sets of filmstrips, Creative Visuals, $315.00 for the series.

These filmstrips comprise a basic program designed to teach users of technical drawings how to read shapes and dimensional information. Areas covered include: orientation (8 filmstrips - $66.50); shape representation and reading (12 filmstrips - $99.00); dimensioning (7 filmstrips - $58.00); precision tolerance and special views (6 filmstrips - $50.00); and working drawings (7 filmstrips - $58.00).

Lettering. 11 filmloops, color, EBE, $22.00 each.

These filmloops illustrate the basics of lettering, covering such areas as guide lines, basic strokes, and spacing. Close-up views make these films useful for individual study. A teacher's guide accompanies each filmloop.

Mechanical Drawing. 15 filmloops, color, Eye Gate House, $22.00 each, $330.00 for the series.

This series is arranged to guide the learner through various skills and concepts of drafting. Basic tools of the trade, such as the T-square, pencils, erasing shield, triangles, and compasses are introduced in a simplified manner.

Mechanical Drawing. 8 filmloops, color, Scott Education Division, $24.00 each.

These filmloops introduce each of the basic instruments used in drafting and demonstrate proper techniques for their use. The protractor, bow compass, and basic mechanical drawing techniques are covered.

Mechanical Drawing. Filmloops, b & w, Thorne Films, $24.00 each, $192.00 for the set.

Mechanical Drawing is a series of silent filmloops which introduce the student to the basic tools in mechanical drawing and their use.

Microfilm Overview. 68 slides with audio cassettes, Keuffel & Esser Co. Available from National Micrographics Association, complimentary loan.

These slides explain the organization of a microfilm system, including input, duplication, reference, and retrieval. Described are the types of equipment needed, the advantages of using such a system, and the process of creating engineering drawings. Various kinds of microfilm equipment are displayed.

Microfilm in Your Life. 44 slides with audio cassettes, Eastman Kodak Co. Available from National Microfilm Association, complimentary loan.

Discusses the applications of microfilm and the future applications of microfiche in the home.

Perspective I and II. 2 filmstrips with records or audio cassettes, color, Demo Educational Corporation, $21.00 and $23.00 each.

Perspective Part I is concerned with teaching basic freehand techniques, while the second part demonstrates advanced techniques in perspective.

Practical Drafting: Series I and II. 10 filmstrips with records or audio cassettes, Career Aids, $24.00 for each program, ($96.00 for each series).

Each of these filmstrips relates a drafting procedure or drafting principles to situations in a career. Lettering, sections, shape description, size description, auxiliary views, isometric drawing, developments, drawing and specifying screw threads, and assembly and detail drawings are covered. A teacher's guide is included for each filmstrip.

Working Drawings. 6 filmloops, color, EBE, $22.00 each.

These filmloops show how working drawings communicate all the information necessary for making or assembling three-dimensional components. Projection of views, hidden details, and assembly drawings are covered.

The World of the Construction Site: Light Commercial Architecture. 291 slides with audio tape, $295.00; or 6 filmstrips with audio tape, $275.00, Robert J. Brady Co., 1974.

This series of visuals covers the phases of light commercial building. Elements of design, foundations and concrete work, steel and concrete structures, wood structures, exteriors, and interiors are discussed. The visuals are intended to supplement, but not replace, a textbook. An instructor's guide containing a script, suggestions for use, objectives, and 16 overhead transparency masters is also provided.

The World of the Construction Site: Residential Architecture. 261 slides with audio tape ($295.00) or 5 filmstrips with audio tape ($275.00), color, Robert J. Brady Co., 1974.

These visuals trace the construction of a residential house from excavation to completion. The five areas covered include excavation and masonry, framing, exterior finishing, utility service systems, and interior finishing. This series which can be used in architectural drafting or building construction classes, is intended to supplement a textbook. An instructor's guide is provided to complement the content of the slides.

TRANSPARENCIES

ABC's of Drafting. 46 transparencies, color, DCA, $150.00 for the series.

The complete series consists of 36 color transparencies which cover basic skills (15 trans. - $52.00), size and shape description (8 trans. - $43.00), and pictorial drawing (13 trans. - $59.00). Transparencies may be purchased separately.

Architectural Drawing. 58 transparencies - $146.25, or 58 slides - $72.75, Gaskell Teaching Aids.

These visuals, which are part of the Gaskell Teaching Aids System, cover floor plans, presentation drawings, elevations, details, and other topics. The text Architectural Drawing ($1.60) by Gaskell can be used to reinforce the content of the visuals.

Architectural Drafting. 27 transparencies, color, DCA, $172.50 for the set.

This architectural drafting set consists of 27 multicolored transparencies with 68 overlays. Details, vocabulary, symbols, and procedures relevant to construction are illustrated. Transparencies may be purchased separately, with prices ranging from $4.50 to $10.00.

Architectural Drafting. 27 transparencies, Eye Gate House, $172.50 for the set.

An explanation of the details related to construction, construction symbols, floor plans, and elevations are among the topics covered in this series of transparencies.

Basic Graphics. 267 transparencies - $736.00, or 318 slides - $360.00, Gaskell Teaching Aids.

Basic Graphics is part of the Gaskell Teaching Aids System. These transparencies or slides are correlated to the book Engineering Drawing Principles ($7.16) by Gaskell. Areas covered include lettering, drafting equipment and techniques, curve and chart drawing, orthographic projection, freehand sketching, isometric drawing, oblique drawing, auxiliary views, sectional views, dimensioning, shop processes, screw threads and fasteners, limit dimensioning, work drawings, and piping and welding. Units of transparencies or slides may be purchased separately.

Descriptive Geometry. 304 transparencies - $950.00, or 338 slides - $480.00, Gaskell Teaching Aids.

These visuals are part of the Gaskell Teaching Aids System. The transparencies and slides cover: auxiliary views and line terminology; bearing and slope of line; points; lines and planes; slope and true size of planes; mining problems and terminology; and skew lines. Units of transparencies or slides may be purchased separately.

Drafting. Four sets of transparencies, 3M Co., $35.00 for each set.

These four sets cover basic terminology, symbols, and techniques that beginning drafting students should know. Areas covered include basic pneumatic control, orthographic projection, auxiliary views, and oblique drawing.

Drafting: Basic Techniques. 32 transparencies, Prakken Publications, $227.25.

This set of transparencies can be used separately or with the Drafting: Basic Techniques student text and instructor's guide published by Prakken. Each transparency, which can be purchased separately, has two to six color-coded overlays to emphasize different parts on the drawing.

Drafting I Transparencies. 108 transparencies, Instructional Materials Laboratory, University of Missouri-Columbia, $44.00.

These transparencies can be used separately or in conjunction with the manual Drafting I Instructor's Guide published by the University of Missouri. Basic equipment, geometric constructions, pictorial drawing, auxiliary views, and work drawings are among the areas illustrated. The transparencies are keyed to the lesson plans in the instructor's guide.

Kinematics. 215 transparencies - $515.00, or 214 slides - $265.00, Gaskell Teaching Aids.

The kinematics visuals are part of the Gaskell Teaching Aids System. The visuals are keyed to the text Principles of Kinematics ($4.00) published by Gaskell. Covered are vectors, intersection of solids, applied descriptive geometry, motion analysis, gears, cams, and development of lateral surfaces. Units of transparencies or slides may be purchased separately.

Machine and Engineering Drafting. 26 transparencies, color, DCA, $198.50 for the series.

This series can be used for teaching advanced machine and engineering drafting classes. Covered are point projection, sectioning, rendering, dimensioning, and orthographic projection. Transparencies may be purchased separately.

Mechanical Drafting. 70 transparencies, color, DCA, $475.00 for the series.

There are seven groups of transparencies in this drafting transparency series. Areas covered include: geometric construction (2 trans. - $23.00); orthographic projection (16 trans. - $127.25); working drawings (8 trans. - $62.00); scale drawing (2 trans. - $16.00); pictorial drawing (10 trans. - $59.00); isometric drawing (20 trans. - $144.00); and section drawing (12 trans. - $77.00). Transparencies may be purchased separately.

Mechanical Drawing. 33 transparencies, color, Creative Visuals, $173.25 for the series.

Topics such as geometric construction, dimensioning, orthographic projection, sectioning, auxiliary views, and developments are covered in this series. Transparencies may be bought separately.

Mechanical Drawing. 25 transparencies, color, United Transparencies. Also available from Demco Educational Corp. or Thompson-Mitchell & Associates, $253.00.

These multicolored transparencies cover several areas of mechanical drawing, including orthographic projection, isometric drawing, section drawing, auxiliary views, and developments. Each transparency may be purchased separately.

Mechanical Drawing Series. 60 transparencies, color, Milliken Publishing Co., $9.95 each group, $35.00 for the series.

Four groups of transparencies cover lettering, the scale and sketching (12 trans.), drafting tools, lines and circles (16 trans.), geometric constructions (16 trans.), and orthographic projection (16 trans.).

Perspective Drawing. 44 transparencies - $111.25, or 44 slides - $55.50, Gaskell Teaching Aids.

These visuals illustrate the principles of one, two, and three-point perspective drawing. Covered is the drawing of sloping surfaces, circles, and buildings in perspective. The student text Perspective Drawing Simplified ($1.60) by Gaskell can be used to complement these visuals.

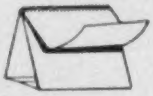
Technical Drawing and Design: Volumes I and II. 2 visu-book sets, Scott Educational Division, $43.00 each set; visu-book stage (required) $9.95; spirit master set, $5.75.

These transparencies show the principles of power transmission using spur gears. The development of gears is shown, along with their application and the methods of drawing them. The spirit master worksheets provide skill exercises for reinforcing the lessons. Volume II shows other methods of transmitting power such as bevel gears, racks, helical gears, chains, and belts.

Technical Graphics. Transparency masters, Keuffer and Esser Co. Write for price.

These transparency masters cover a variety of areas in drafting.

OTHER MEDIA



Architectural Illustration Guides. Instant Landscape. Volume 1, 30 pages, $15.00; Volume 2, 30 pages, $15.00; (Both for $25.00).

Architectural Illustration Guides can be used as reference material or as tracing guides for architectural rendering. Pencil, pen and ink, and watercolor techniques are covered in these guides. A variety of sizes and shapes of people, trees, plants, vehicles, furniture and other objects are illustrated. These guides can save students a great deal of time, since all they have to do is trace. Architectural rubber stamps, applique sheets and a subscription service which provides more drawings throughout the year ($24) are also available from Instant Landscape.

Blue Print Reading. Four 30 minute videotapes, TAD Products, $950.00.

These videotapes, developed by the General Electric Company, cover projections, sections, types of drawings, and symbols and notes. Each tape utilizes many models and graphic aids. Included is a quiz series covering the content of each program.

Drafting. 6 audio cassettes, National Book Company, available from Thompson-Mitchell & Associates, $77.10 for the series.

This series provides instruction on basic techniques in drafting. A fully illustrated student workbook ($6.95) and a key to the workbook ($3.50) can also be purchased.

Drafting: Basic Techniques. Prakken Publications. Text, 160 pages, $5.75; instructor's guide, 176 pages; 32 transparencies, $227.25.

This combination of media covers 86 lessons. Each lesson includes a basic drawing problem, an explanation of the object's function, learning experiences, and procedures for completing the assignment. The instructor's guide and transparencies complement the student text. Each transparency has two to six color-coded overlays to emphasize different parts of the drawing.

Drafting and Blueprint Reading. 12 audio cassettes, Career Aids, $72.00.

These cassettes cover various aspects of reading architectural and machine blueprints.

Drafting Guide for Microfilm. National Micrographics Association, $4.00.

This is a plastic card, 3 1/4" x 7 3/8", that enables draftsmen to determine if a drawing will produce good quality microfilm. The guide permits checking line widths, character height, distance between a pair of lines or characters, and contrast.

Geometric Tolerancing and Dimensioning. Eleven 30 minute videotapes, TAD Products, $3190.00.

These videotapes, developed by the General Electric Company, thoroughly cover the topic of geometric tolerancing and dimensioning. A quiz series is included that covers the content of each program.

Introduction to Micrographics. 2 microfiches with audio cassettes ($20.00), or 65 slides with audio cassettes ($100.00), National Micrographics Association.

This series displays the characteristics of the many forms of microfilm, shows how microfilm is produced and duplicated, and indicates various types of equipment that have helped to make microfilm useful to business, education, government, and industry.

Micrometer, Vernier Protractor, and Vernier Caliper. Gaskell Teaching Aids. Write for price.

These plastic working models of a micrometer, vernier protractor, and vernier caliper are good teaching aids to teach precision measurement on the overhead projector.

Selected Professional Careers Series. 12 audio cassettes, Mafex Media Aids, $105.00.

This cassette tape program is designed for career awareness and exploration. Each lesson presents the nature of the work in a specific occupation, probable earnings, job prospects for the future, and educational and training requirements. The careers of a draftsman and architect are included in the twenty-four occupations covered.

TRADE AND PROFESSIONAL ORGANIZATIONS

A variety of services and resource materials may be obtained from the following trade and professional organizations. One should write directly to the organization to find out information about services and publications.

American Congress on Surveying & Mapping
430 Woodward Building
733 15th Street, N.W.
Washington, D.C. 20006

American Engineering Model Society
P.O. Box 277
Ross, Ohio 45061

American Federation of Information Processing Societies
210 Summit Avenue
Montvale, New Jersey 07645

American Federation of Technical Engineers
1126 16th Street, N.W.
Washington, D.C. 20036

American Institute of Aeronautics
and Astronautics
1290 Avenue of the Americas
New York, New York 10019

American Institute of Architects
1735 New York Avenue
Washington, D.C. 20036

American Institute for Design and Drafting
3119 Price Road
Bartlesville, Oklahoma 74003

American National Metric Council
1625 Massachusetts Avenue, N.W.
Washington, D.C. 20036

American National Standards Institute
1430 Broadway
New York, New York 10018

American Society of Certified Engineering Technicians
2029 K Street, N.W.
Washington, D.C. 20006

American Society for Engineering Education
Engineering Design Graphics Division
One Dupont Circle
Washington, D.C. 20036

American Society of Industrial Designers
15 East 48th Street
New York, New York 10017

American Society of Photogrammetry
6269 Leesburg Pike
Falls Church, Virginia 22044

American Society of Professional Draftsmen and Artists
415 St. Paul Place
Baltimore, Maryland 21221

American Society for Testing and Materials
1917 Race Street
Philadelphia, Pennsylvania 19103

Association of Reproduction Materials Manufacturers
901 North Washington Street
Alexandria, Virginia 22313

Association of Structural Draftsmen of America
17023 West Ten Mile Road
Southfield, Michigan 48075

Canadian Micrographic Society
Bentall Centre, Box 48238
Vancouver, British Columbia
V7X1AI Canada

Center for Metric Education
Western Michigan University
Kalamazoo, Michigan 49001

Design and Drafting Management Council
P.O. Box 11811
Santa Ana, California 92711

Engineering Reprographics Management Association
947 Old York Street
Abington, Pennsylvania 19001

Global Engineering and Documentation Service
3950 Campus Drive
Newport Beach, California 92660

Industrial Graphics International
P.O. Box 4046
Huntsville, Alabama 35802

The Institute for the Certification of
  Engineering Technicians
2029 K Street, N.W.
Washington, D.C. 20006

The Institute of Draftsmen
36 Filbert Street
South Caulfield, 3162
Victoria, Australia

Institute for Graphic Communication
520 Commonwealth Avenue
Boston, Massachusetts 02215

Instrument Society of America
400 Stanwix Street
Pittsburgh, Pennsylvania 15222

International Association of Graphic Communications
P.O. Box 84
Los Alamitas, California 90720

International Micrographic Congress
P.O. Box 484
Del Mar, California 92014

International Organization for Standardization
1 Rue De Berube
1121 Geneva 210 Switzerland

International Repro Graphic Blueprint Association
10116 Franklin Avenue
Franklin Park, Illinois 60131

Metric Association
2004 Ash Street
Waukegan, Illinois 60085

National Bureau of Standards
U.S. Department of Commerce
Washington, D.C. 20234

National Electrical Manufacturers Association
821 15th Street, N.W.
Washington, D.C. 20036

National Micrographics Association
8728 Colesville Road
Silver Spring, Maryland 20910

National Technical Services Association
1225 Connecticut Avenue, N.W.
Washington, D.C. 20036

National Visual Communications Association
507 Fifth Avenue, Room 300
New York, New York 10017

New England Design Drafting Managers Association
CTI-Cryogenics
226 2nd Avenue
Waltham, Massachusetts 02145

Penninsula Drafting Management Association
P.O. Box 11271
Palo Alto, California 94306

Society of Automotive Engineers
Warrendale, Pennsylvania 15096

Society of Engineering Technologists
2210 W. 12th Avenue
Vancouver, British Columbia

Society for Technical Communication
1010 Vermont Avenue, N.W., Suite 421
Washington, D.C. 20005

Standards Engineers Society
P.O. Box 7505
Philadelphia, Pennsylvania 19101

U. S. Metric Association
Sugarloaf Star Route
Boulder, Colorado 80302

GENERAL RESOURCES

This section contains general resources which the teacher should become familiar with and utilize. The resources can supply valuable and useful services and materials to the classroom teacher. One should write directly to the particular organization or agency for further information.

CURRICULUM DEVELOPMENT CENTERS

The following is a list of instructional materials centers or laboratories, curriculum labs, and research and development centers. Each agency offers a variety of curriculum materials such as curriculum guides, learning activity packages, transparencies, and tests. Most of the materials are competency-based, self-paced, and adaptable for individualized instruction. One should write for a catalog of a particular center's publications.

California State Department of Education
721 Capitol Mall
Sacramento, California 95814

Curriculum Materials Service
Department of Vocational Education
Colorado State University
Vocational Education Building
Ft. Collins, Colorado 80523

Career Education Center
415 North Monroe Street
Tallahassee, Florida 32306

American Association for Vocational Instructional Materials
Engineering Center
Athens, Georgia 30602

The Center for Vocational Education Curriculum Materials Development
628 Aderhold Hall
University of Georgia
Athens, Georgia 30602

Illinois Curriculum Management Center
Division of Vocational and Technical Education
1035 Outer Park Drive, Suite 201
Springfield, Illinois 62706

Instructional Materials Laboratory
School of Technology
Indiana State University
Terre Haute, Indiana 47800

Iowa Association for Vocational Instructional Materials
Agricultural Engineering Department
Iowa State University
Ames, Iowa 50010

Kansas Vocational and Technical Curriculum Center
Kansas State College of Pittsburgh
Pittsburgh, Kansas 66762

Curriculum Development Center
Taylor Education Building, Room 151
University of Kentucky
Lexington, Kentucky 40506

Vocational Curriculum Development and Research Center
P.O. Box 657
Natchitoches, Louisiana 71457

Vocational Curriculum Research and Development Center
Department of Industrial Education
University of Maryland
College Park, Maryland 20742

Technical Education Research Center
44 Brattle Street
Cambridge, Massachusetts 02138

Massachusetts Center for Occupational Education
Two Sun Life Park, 100 Worcester Street
Wellesley Hills, Massachusetts 02181

Minnesota Instructional Materials Center
3300 Century Avenue North
White Bear Lake, Minnesota 55110

Research and Curriculum Coordinating Unit
Mississippi State University
P.O. Drawer DX
State College, Mississippi 39762

Instructional Materials Laboratory
8 Industrial Education
Columbia, Missouri 65201

Vocational-Technical Curriculum Laboratory
Rutgers University
Building 4103 - Kilmer Campus
New Brunswick, New Jersey 08903

Vocational Instruction Unit
New Mexico State Department of Education
Education Building
Sante Fe, New Mexico 87503

Institute for Occupational Education
Cornell University
Stone Hall
Ithaca, New York 14840

The Center for Occupational Education
North Carolina State University
Raleigh, North Carolina 27607

The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
1885 Neil Avenue
Columbus, Ohio 43210

Curriculum and Instructional Materials Center
State Department of Vocational and Technical Education
1515 West Sixth Avenue
Stillwater, Oklahoma 74074

Continuing Education Publications
Extension Annex
Corvallis, Oregon 97331

Vocational Education Resource Center
Regional Office of Education
Box 729
Hato Rey, Puerto Rico 00917

Vocational Education Media Center
Clemson University
Freemen Hall
Clemson, South Carolina 29631

Vocational Curriculum Laboratory
State of Tennessee
Department of Education
P.O. Box 1114
Murfreesboro, Tennessee 37130

Instructional Materials Center
Division of Extension
The University of Texas at Austin
Austin, Texas 78712

Vocational Instructional Services
Vocational-Industrial Education Department
Texas A & M University
College Station, Texas 77843

Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

EDUCATIONAL RESOURCES INFORMATION CENTER

The Educational Resources Information Center (ERIC) of the National Institute of Education (NIE) is a national information system which is designed to provide the educational community with access to research reports and other non-commercial literature. The documents are catalogued, abstracted, and indexed, and can be obtained in microfiche (film) or hard copy.

ERIC announces the documents processed by its clearinghouses through two publications: Resources in Education (RIE) for research reports and other documents, and the Current Index to Journals in Education (CIJE) for articles from over 700 journals.

Currently the clearinghouse for vocational education is located at The Ohio State University. Bibliographies, technical reports and computer searches are available. For details, write to Ohio State.

The ERIC clearinghouses have the responsibility within the network for acquiring the significant educational literature within their particular areas, selecting the highest quality and most relevant material, processing (i.e. cataloging, indexing, abstracting) the selected items for input to the data base, and providing information analysis products and various user services based on the data base.

The exact number of clearinghouses has fluctuated over time in response to the shifting needs of the educational community. There are currently 16 clearinghouses. These are listed below.

ERIC Clearinghouse in Career Education
The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

ERIC Clearinghouse on Adult Education and Lifelong Learning
204 Gabel Hall
Northern Illinois University
DeKalb, Illinois 60115

ERIC Clearinghouse on Early Childhood Education
College of Education
University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois 61801
Telephone: (217) 333-1386

ERIC Clearinghouse on Educational Management
University of Oregon
Eugene, Oregon 97403
Telephone: (503) 686-5043

ERIC Clearinghouse on Handicapped and Gifted Children
Council for Exceptional Children
1920 Association Drive
Reston, Virginia 22091
Telephone: (703) 620-3660

ERIC Clearinghouse on Higher Education
George Washington University
One Dupont Circle, Suite 630
Washington, D.C. 20036
Telephone: (202) 296-2597

ERIC Clearinghouse on Information Resources
Stanford University
School of Education
Center for Research and Development in Teaching
Stanford, California 94305
Telephone: (415) 497-3345

ERIC Clearinghouse for Junior Colleges
University of California
Powell Library, Room 96
405 Hilgard Avenue
Los Angeles, California 90024

ERIC Clearinghouse on Language and Linguistics
Center for Applied Linguistics
1611 North Kent Street
Arlington, Virginia 22209
Telephone: (703) 528-4312

ERIC Clearinghouse for Reading and Communication Skills
National Council of Teachers of English
1111 Kenyon Road
Urbana, Illinois 61801
Telephone: (217) 328-3870

ERIC Clearinghouse on Rural Education and Small Schools
New Mexico State University
Box 3AP
Las Cruces, New Mexico 88003
Telephone: (505) 646-2623

ERIC Clearinghouse on Science, Mathematics, and Environmental Education
The Ohio State University
1800 Cannon Drive
400 Lincoln Tower
Columbus, Ohio 43210

ERIC Clearinghouse for Social Studies/Social Science Education
855 Broadway Street
Boulder, Colorado 80302
Telephone: (303) 492-8434

ERIC Clearinghouse on Teacher Education
American Association of Colleges for Teacher Education
One Dupont Circle, Suite 616
Washington, D.C. 20036
Telephone: (202) 293-7280

ERIC Clearinghouse on Tests, Measurements, and Evaluation
Educational Testing Service
Princeton, New Jersey 08540
Telephone: (601) 920-9000 ext. 2182

ERIC Clearinghouse on Urban Education
Columbia University, Teachers College
Box 40
525 West 120th Street
New York, New York 10027
Telephone: (212) 678-3780

Educational Resources Information Center
Central Office
National Institute of Education
Washington, D.C. 20208
Telephone: (202) 254-5040

ERIC Processing and Reference Facility
4833 Rugby Avenue, Suite 303
Bethesda, Maryland 20014
Telephone: (301) 656-9723

ERIC Document Reproduction Service
P.O. Box 190
Arlington, Virginia 22210
Telephone: (703) 841-1212

THE NATIONAL NETWORK FOR CURRICULUM COORDINATION IN VOCATIONAL AND TECHNICAL EDUCATION (NNCCVTE)

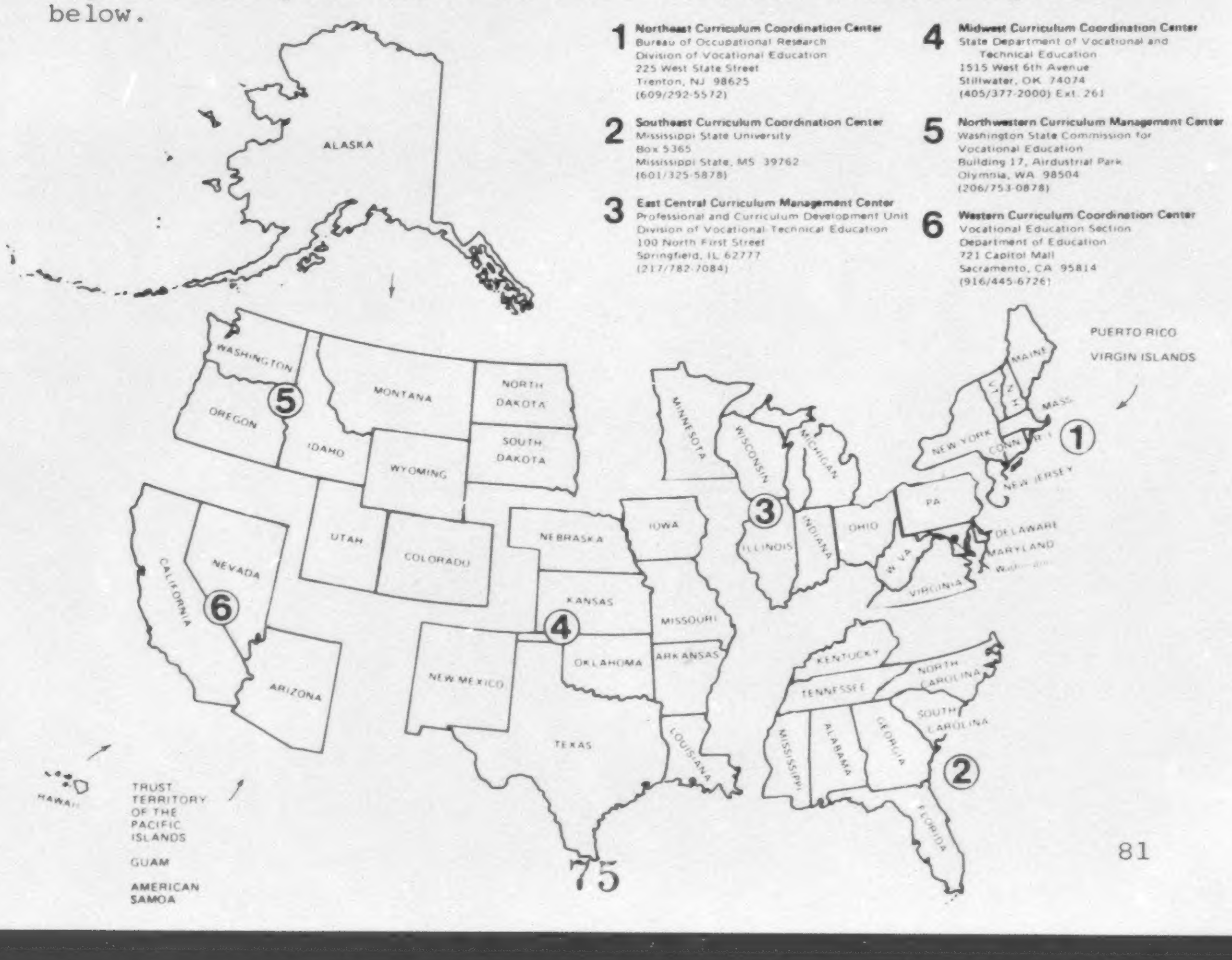
A nationwide curriculum management system has been established by the U. S. Office of Education for the purpose of providing a controlled system through which vocational and technical education curriculum materials can be shared and duplication avoided.

California, Illinois, Kentucky, Mississippi, New Jersey, Oklahoma, and Washington are serving as curriculum coordinating centers. Each of these states houses a curriculum management center designed to provide services to educators within their region concerning curriculum and instructional materials. These services include national and state articulation and coordination of available materials, dissemination and diffusion of selected materials, plus acquisition and display of materials in a professional resource library.

Each regional center holds meetings with its states' liaison personnel to identify and discuss curriculum activities and materials at both the state and national levels, and to collectively pool anticipated needs. Regional newsletters, as well as a national one, are published.

Maryland belongs to the East Central Curriculum Management Center, along with Delaware, the District of Columbia, Illinois, Indiana, Michigan, Minnesota, Ohio, Pennsylvania, Virginia, West Virginia, and Wisconsin. The ECCC Curriculum Management Center is located in Springfield, Illinois.

Regional makeup has fallen into the breakdown of states depicted below.



1 **Northeast Curriculum Coordination Center**
Bureau of Occupational Research
Division of Vocational Education
225 West State Street
Trenton, NJ 98625
(609/292-5572)

2 **Southeast Curriculum Coordination Center**
Mississippi State University
Box 5365
Mississippi State, MS 39762
(601/325-5878)

3 **East Central Curriculum Management Center**
Professional and Curriculum Development Unit
Division of Vocational-Technical Education
100 North First Street
Springfield, IL 62777
(217/782-7084)

4 **Midwest Curriculum Coordination Center**
State Department of Vocational and
Technical Education
1515 West 6th Avenue
Stillwater, OK 74074
(405/377-2000) Ext. 261

5 **Northwestern Curriculum Management Center**
Washington State Commission for
Vocational Education
Building 17, Airdustrial Park
Olympia, WA 98504
(206/753-0878)

6 **Western Curriculum Coordination Center**
Vocational Education Section
Department of Education
721 Capitol Mall
Sacramento, CA 95814
(916/445-6726)

ALASKA
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NORTH DAKOTA
SOUTH DAKOTA
NEVADA
CALIFORNIA
UTAH
COLORADO
ARIZONA
NEW MEXICO
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
W. VA.
PA
NEW YORK
NEW JERSEY
DELAWARE
MARYLAND
CONN
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PUERTO RICO
VIRGIN ISLANDS
HAWAII
TRUST TERRITORY OF THE PACIFIC ISLANDS
GUAM
AMERICAN SAMOA

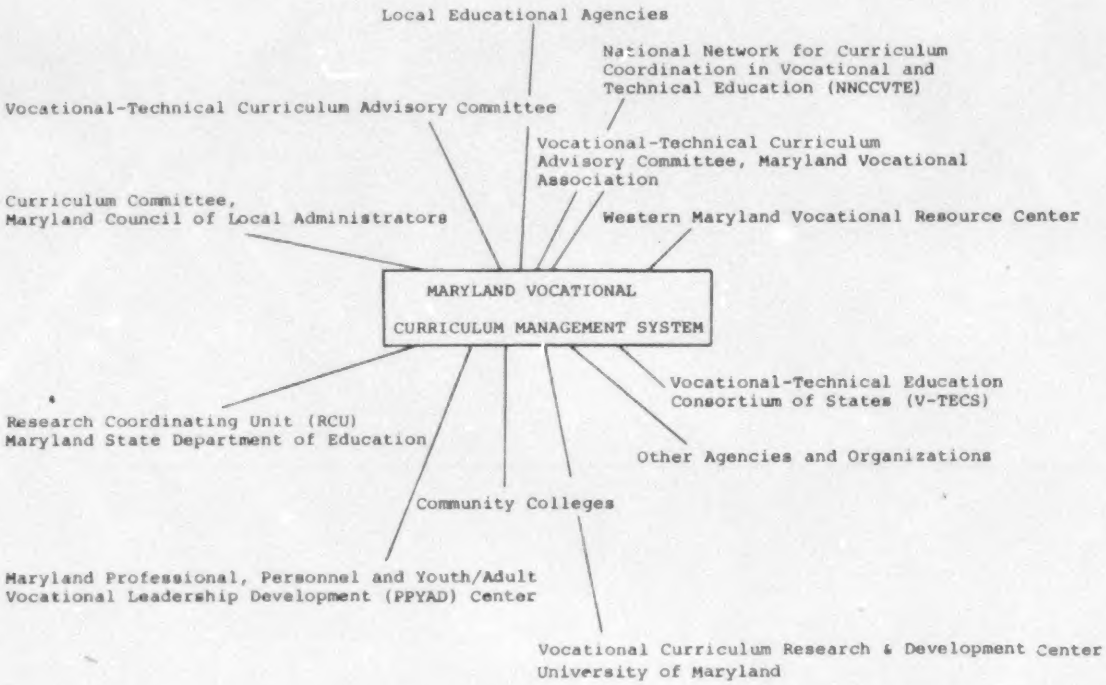
CURRICULUM RESOURCES WITHIN MARYLAND

There are several resources which Maryland vocational educators can use to assist them in their curriculum development efforts. The following section contains a description of different organizations and their services to Maryland educators.

MARYLAND VOCATIONAL CURRICULUM MANAGEMENT SYSTEM

The Maryland Vocational Curriculum Management System has been established to provide a coordinated effort in regard to curriculum development and dissemination activities in the state. Through the establishment of certain linkages, communications and the flow of information and materials are provided. Liaison persons have been identified in each local educational agency and other organizations throughout the state, and it is through these individuals that the relationship to the State Curriculum Management System is established. The primary objective of the total effort is to get good useable curriculum materials and support resources into the hands of classroom teachers.

The below figure illustrates the various linkages within and outside the state.


Local Educational Agencies
National Network for Curriculum Coordination in Vocational and Technical Education (NNCCVTE)
Vocational-Technical Curriculum Advisory Committee
Vocational-Technical Curriculum Advisory Committee, Maryland Vocational Association
Curriculum Committee, Maryland Council of Local Administrators
Western Maryland Vocational Resource Center
MARYLAND VOCATIONAL CURRICULUM MANAGEMENT SYSTEM
Vocational-Technical Education Consortium of States (V-TECS)
Research Coordinating Unit (RCU) Maryland State Department of Education
Other Agencies and Organizations
Community Colleges
Maryland Professional, Personnel and Youth/Adult Vocational Leadership Development (PPYAD) Center
Vocational Curriculum Research & Development Center University of Maryland

Inter-state linkages play an important role in providing materials and services to the system. The National Network for Curriculum Coordination in Vocational and Technical Education, and specifically the East Central Curriculum Management Center housed in Illinois, provide vast sources of materials and information. Maryland is also a member of the Vocational-Technical Consortium of States (V-TECS), an organization concerned with the development of catalogs of performance objectives, performance guides, and criterion-referenced measures.

Maryland teachers can receive curriculum materials and information from their local curriculum liaison person and, in turn, should direct any request for materials for review purposes to these individuals. For further information about the system or the name of your liaison person, contact:

Mr. William Michel, Jr.
Curriculum Specialist
Maryland State Department of Education
Division of Vocational-Technical Education
Baltimore-Washington International Airport
Baltimore, Maryland 21240
(301) 796-8300

VOCATIONAL CURRICULUM RESEARCH & DEVELOPMENT CENTER

The Vocational Curriculum Research & Development Center, which operates within the Industrial Education Department at the University of Maryland, is a curriculum development center for vocational-technical education. Instructional materials, research, workshops, conferences, seminars, and other activities are conducted in the fields of:

- Apprenticeship Training
- Career Education
- Cooperative Work Experience
- Industrial Arts
- Industrial Training
- Vocational Education

The Center's function is to assist educational, governmental, business, labor, and other community personnel, agencies, and organizations in improving vocational related educational programs by:

- Developing, dissemination, and diffusing curriculum materials.

- Conducting research on problems related to industrial, vocational, and technical education.

- Providing technical assistance and training in dealing with educational problems.

- Serving as an information resource for educators and administrative personnel in the areas of industrial, vocational, and technical education.

The Center's activities and personnel are funded by local, state, and national agencies. Personnel from education, business, government, and industry serve as consultants. The aim of the Center is to provide quality research, instructional materials, and services.

In addition to offices for its staff, the Center maintains and operates a Resource Center and Media Center. The Resource Center contains a collection of the most recent instructional materials in vocational education, industrial arts, career education, and related areas. Resources include curriculum guides, textbooks, course outlines, learning activity packages, teaching aids, professional journals, reference books, and catalogs. Teachers or administrators of vocational education may use the Center for curriculum study, development, and research. A series of individual carrels are available for those who would like to use the facilities over an extended period of time.

The Media Center is located adjacent to the Resource Center. Educators may use this facility for instructional materials development. The Media Center consists of a suite of rooms for educational technology activities including film previewing, audio and video typing, and instructional aid development.

For further information, contact:

Director
Vocational Curriculum Research & Development Center
Department of Industrial Education
University of Maryland
College Park, Maryland 20742
(301) 454-4264

WESTERN MARYLAND VOCATIONAL RESOURCE CENTER

The Western Maryland Vocational Resource Center, located near

Cumberland, Maryland, functions as a statewide center for the collection, reproduction, utilization, and dissemination of vocational-technical materials. The Center is a key element in the Maryland Vocational Curriculum Management System, and acts as a clearinghouse for Maryland's participation in the National Network for Curriculum Coordination in Vocational and Technical Education.

Services and functions of the Center include:

- Collecting, cataloging, distributing, and loaning printed and nonprinted vocational materials.
- Designing, producing, field testing, and evaluating different types of instructional media.
- Printing and reproducing instructional materials for statewide distribution.
- Providing consulting services, both in-house and on location, in the areas of filming, and video and audio typing.

The Center's services are available to all vocational administrators, teachers, and students in Maryland. For details about utilization of the Center's services, contact:

Mr. Charles E. Johnson, Director
Western Maryland Vocational Resource Center
P.O. Box 5488, McMullen Highway
Cresaptown, Maryland 21502
(301) 729-0361

MARYLAND PROFESSIONAL, PERSONNEL AND YOUTH/ADULT VOCATIONAL LEADERSHIP DEVELOPMENT CENTER

The Maryland Professional, Personnel and Youth/Adult Vocational Leadership Development (PPYAD) Center is responsible for planning, coordinating, developing, and implementing inservice and field-based preservice programs in vocational education. The purpose of the PPYAD Center is to improve the quality of vocational education in Maryland through the development and coordination of vocational education preservice and inservice field-based research in professional personnel development programs for teachers, counselors, youth development advisors and administrative, supervisory personnel.

Leadership and coordination are provided in the areas of consumer and homemaking, trades and industry, agriculture, business, distribution education, special needs, vocational guidance, and youth program activities.

The PPYAD Center serves an extension role for the Division of Vocational-Technical Education, Maryland State Department of Education in increasing direct services to local educational agencies and community colleges in Maryland.

The PPYAD Center's method of achieving its objectives is to:

- Offer mini-sessions and seminars to attain State Plan priorities.

- Provide outreach activities in accessible familiar locations.

- Organize technical workshops.

- Work with local educational agencies to implement competency-based vocational education.

- Provide supportive services in planning and organizing inservice seminars, workshops, and conferences.

- Plan and organize unique activities related to vocational education special needs students.

Plan, organize and provide the following for FHA/HERO, FBLA/PBL, FFA, VICA, and DECA:

- Regional, state and local leadership development activities for youth and adults.

- Inservice and/or workshops for local chapter advisors, administrators, teacher educators, and local educational agencies.

- Preservice seminars and workshops to integrate youth/adult activities into the regular vocational education curricula.

- Joint vocational youth conferences.

- Dissemination of materials statewide.

For further information, contact:

Mr. Robert Tormey, Director
Arbutus Junior High School
5525 Shelbourne Road
Baltimore, Maryland 21227
(301) 242-2727

INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM

The Research Coordinating Unit of the Maryland State Department of Education has established an Information Retrieval and Dissemination System which can be utilized by vocational educators within Maryland. Complimentary services include:

- Computer searches of the educational resource banks of the Educational Resources Information Center (ERIC) and Abstracts of Instructional and Research Materials in Vocational-Technical Education AIM/ARM).
- Microfiche copies of desired documents in ERIC.

A request for information about any topic related to vocational education will result in a bibliographical listing of documents and journal articles abstracts and citations. Microfiche copies (4" x 6" sheets of film which can be read by using a microfiche reader) of desired full documents may then be ordered from the RCU Data Center. The service can be utilized by contacting:

Ms. Rella Hines
RCU Data Center
North Arundel Vocational-Technical Center
Box 69, Route 7
Severn, Maryland 21144
(301) 969-9000

SOURCE LISTING

ACI Films/Media
35 West 45th Street.
New York, New York 10036

Adcom
502 West Broad Street
Falls Church, Virginia 22043

Admiral Peary Area Vocational-Technical
School
Route 422 W., R.D. 2
Edensburg, Pennsylvania 15931

Aims Instructional Media Services
626 Justin Avenue
Glendale, California 91201

Alabama State Department of Education
Division of Vocational Education &
Community Colleges
State Office Building
Montgomery, Alabama 36104

Allyn and Bacon
Rockleigh, New Jersey 07647

American Association for Vocational
Instructional Materials
Engineering Center
Athens, Georgia 30602

American Council of Industrial Arts
Supervisors
Capitol Complex
Building D, Room B-318
Charleston, West Virginia 25305

American Industrial Arts Association
1201 16th Street, N.W.
Washington, D.C. 20036

American Institute of Architects
1735 New York Avenue, N.W.
Washington, D.C. 20006

American Institutes for Research
7110 Catham Center
Pittsburgh, Pennsylvania 15213

American Library Association
50 East Huron Street
Chicago, Illinois 60611

American National Metric Council
1625 Massachusetts Avenue, N.W.
Washington, D.C. 20036

American Savings and Loan Institute
Press
111 East Walker Drive
Chicago, Illinois 60601

American Society of Landscape Architects
1750 Old Meadow Road
McLean, Virginia 22101

American Society of Mechanical Engineers
345 East 47th Street
New York, New York 10017

American Technical Society
848 East 58th Street
Chicago, Illinois 60637

American Vocational Association
1510 H. Street, N.W.
Washington, D.C. 20005

Animated Electronic Films
P.O. Box 545
Annapolis, Maryland 21404

Arco Publishing Company
219 Park Avenue, South
New York, New York 10003

Arthur Mokin Productions
17 W. 60th Street
New York, New York 01123

Association-Sterling Films
Executive Offices
866 Third Avenue
New York, New York 10022

Baltimore City Public Schools
Vocational Education Area
3 East 25th Street
Baltimore, Maryland 21218

Barnes and Noble Books
105 Fifth Avenue
New York, New York 10003

Bay State Film Productions
Box 129
Springfield, Massachusetts 01101

Bennett Books
Chas. A. Bennett Company
809 West Detweiller Drive
Peoria, Illinois 61614

Bergwall Productions
839 Stewart Avenue
Garden City, New York 11530

BFA Films/Educational Media
2211 Michigan Avenue, P.O. Box 1795
Santa Monica, California 90404

BNA Communications
5615 Fishers Lane
Rockville, Maryland 20852

Bro-Dart
1609 Memorial Avenue
Williamsport, Pennsylvania 17701

Brodhead-Garrett Company
4560 East 71st Street
Cleveland, Ohio 44105

The Bruce Publishing Company
866 Third Avenue
New York, New York 10022

Brunning Company
Division of Addressograph Multigraph
1834 Walden Office Square
Schaumburg, Illinois 60172

Cahners Publishing Company
221 Columbus Avenue
Boston, Massachusetts 01772

California State Department of Education
Business Service Section
Textbook and Publication Sales
721 Capitol Mall
Sacramento, California 95814

Capital Area Career Center
611 Hagadom Road
Mason, Michigan 48854

Cardinal Associates
Charlotte, North Carolina 28202

Career Aids
5024 Lankershim Boulevard
North Hollywood, California 91601

Career Education Dissemination Services
117 Perry Street
Lowell, Massachusetts 01852

Carroll County Public Schools
c/o Mr. Harold Thompson
Supervisor of Vocational Education
County Office Building
Court Street
Westminster, Maryland 21157

The Center for Occupational Education
North Carolina State University
Raleigh, North Carolina 27607

The Center for Studies in Vocational
and Technical Education
Educational Building, Box 49
University of Wisconsin
Madison, Wisconsin 53706

The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

Charles Quinlan Publisher
P.O. Box 54
Stratford, Connecticut 06497

Chicago Board of Education
Department of Curriculum
228 N. LaSalle Street
Chicago, Illinois 60601

Chilton Company
Chestnut and 56th Streets
Philadelphia, Pennsylvania 19139

Chronicle Guidance Publications
Moravia, New York 13118

Churchill Films
662 North Robertson Boulevard
Los Angeles, California

Clemson University
Vocational Education Media Center
Freeman Hall
Clemson, South Carolina 29631

Colorado State University
c/o Wiley B. Lewis
Curriculum Materials Development
Department of Vocational Education
Fort Collins, Colorado 80523

Community College of the Air Force
Chief, Professional Relations Division
Randolph Air Force Base
Texas 78148

Continuing Education Publications
P.O. Box 1491
Portland, Oregon 97207

Contract Research Corporation
1028 Connecticut Avenue, N.W.
Suite 1001
Washington, D.C. 10036

Co-op Mailings
P.O. Box 248
Hillsdale, New Jersey 07642

Coronet Instructional Media Films
65 East South Water Street
Chicago, Illinois 60601

Creative Visuals
Division of Gamco
Box 1911 - V3
Big Spring, Texas 79720

CRM Films
Del Mar, California 92014

Curriculum Development Center
Taylor Education Building, Room 151
University of Kentucky
Lexington, Kentucky 40506

Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

Datafilms
2625 Temple Street
Los Angeles, California 90025

DCA Educational Products
424 Valley Road
Warrington, Pennsylvania 18976

DCE Publications
P.O. Box 1491
Portland, Oregon 97207

Delmar Publishers
Mountainview Avenue
Albany, New York 12205

Demco Educational Corporation
Box 1488
Madison, Wisconsin 53701

Department of the Navy
Naval Education & Training Support
Center
Commanding Officer
Naval Station, Building Z-86
Norfolk, Virginia 23511

Department of the Navy
Navy Occupational Task Analysis Program
Building 1304
Bolling Air Force Base
Washington, D.C. 20332

Dillon Press
106 Washington Avenue, N.
Minneapolis, Minnesota 55401

Diversified Educational Systems
Berryville, Virginia

Doubleday and Company
501 Franklin Avenue
Garden City, New York 11530

Doubleday Multimedia
P.O. Box 11607
Santa Ana, California 92705

Drake Publishers
381 Park Avenue
New York, New York 10016

Dukane Corporation
Audio Visual Division
Department AVJ-9
St. Charles, Illinois 60174

DuPont De Nemours & Company
Motion Picture Section
Advertising Department
1007 Market Street
Wilmington, Delaware 19898

East Central Curriculum Management Center
Professional and Curriculum Development
  Unit
Division of Vocational-Technical Education
100 North First Street
Springfield, Illinois 62777

Eastman Kodak Company
Audio-Visual Library Distribution
343 State Street
Rochester, New York 14650

Educational Properties
P.O. Box DX
Irvine, California 92664

Educational Testing Service
Princeton, New Jersey 08540

Educators Progress Service
214 Center Street
Randolph, Wisconsin 53956

EDU-PAC of Minnesota
P.O. Box 27101
Minneapolis, Minnesota 55427

Encyclopedia Britannica Educational
  Corporation (EBE)
425 N. Michigan Avenue
Chicago, Illinois 60611

Energy Research & Development Administration
Film Library
P.O. Box 62
Oak Ridge, Tennessee 37830

Engineering Technology
503 East Main Street
Mahomet, Illinois 61853

Eric Document Reproduction Service
P.O. Box 190
Arlington, Virginia 22210

Eye Gate House
146-01 Archer Avenue
Jamaica, New York 11435

F.A.A. Film Library
P.O. Box 25082
Oklahoma City, Oklahoma 73125

Fawcett Publications
Fawcett Place
Greenwich, Connecticut 06830

Fearon Publishers
6 Davis Drive
Belmont, California 94002

Filmstrips, Teaching Aids, Inc.
P.O. Box 3527
Long Beach, California 90803

Florida State Department of Education
Division of Vocational, Technical and
  Adult Education
Tallahassee, Florida 32304

Gaskell Teaching Aids
ADG, Inc.
109 Farmdale Road
Hopkins, Minnesota 55343

General Electric Company
Technology Marketing Operation
Building 5, Room 311
One River Road
Schenectady, New York 12345

General Motors
Public Relations Staff - Film Library
General Motors Building
Detroit, Michigan 48202

Goodheart - Willcox Company
123 West Taft Drive
South Holland, Illinois 60473

Graphicraft
P.O. Box 509
Westport, Connecticut 06880

Grover Film Productions
P.O. Box 303
Monterey, California 93942

Guidelines Publications
P.O. Box 456
Orinda, California 94563

Harcourt Brace Jovanovich
757 Third Avenue
New York, New York 10017

Harper and Row Publishers
49 East 33rd Street
New York, New York 10016

Harvest A-V
309 Fifth Avenue
New York, New York 10016

Hastings House Publications
10 East 40th Street
New York, New York 10016

Hendershot Programmed Learning
4114 Ridgewood Drive
Bay City, Michigan 48706

Hoffman Occupational Learning Systems
4423 Arden Drive
El Monte, California 91734

Holt, Rinehart and Winston
383 Madison Avenue
New York, New York 10017

Houghton Mifflin Company
1 Beacon Street
Boston, Massachusetts 02107

House and Garden Plan Guides
The Conde Nast Publication
Conde Nast Building
310 Madison Avenue
New York, New York 10007

Howard W. Sams & Company
ITT Educational Publishing
4300 West 62nd Street
Indianapolis, Indiana 46206

Ideal Pictures Film Library
4431 West North Avenue
Milwaukee, Wisconsin 53208

State Department of Education
Division of Vocational-Technical
Education
1035 Outer Park Drive
Springfield, Illinois 62706

Indiana University
Audio-Visual Center
Office for Learning Resources
Indiana University
Bloomington, Indiana 47401

Industrial Press
Editorial and Sales Office
200 Madison Avenue
New York, New York 10016

Instant Landscape
#20 Whaleship Plaza
San Francisco, California 94111

Institute for Occupational Education
Cornell University
Stone Hall
Ithaca, New York 14850

Instructional Materials Center
The University of Texas at Austin
Austin, Texas 78712

Instructional Materials Laboratory
School of Technology
Indiana State University
Terre Haute, Indiana 47800

Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
1885 Neil Avenue
Columbus, Ohio 43210

Instructional Materials Laboratory
University of Missouri-Columbia
8 Industrial Education Building
Columbia, Montana 65201

Instructional Objectives Exchange
P.O. Box 24095
Los Angeles, California 90024

International Film Bureau
332 S. Michigan Avenue
Chicago, Illinois 60600

International Reproduction Graphic
Blueprint Association
10116 Franklin Avenue
Franklin Park, Illinois 60131

Iowa Association for Vocational
Instructional Materials
Agricultural Engineering Department
Iowa State University
Ames, Iowa 50018

Iowa State Department of Public
Instruction
Division of Vocational Education
Des Moines, Iowa 50319

Job Corps
Manpower Administration
U.S. Department of Labor
601 D. Street, N.W.
Washington, D.C. 20217

Keuffel and Esser Company
Educational Audio-Visual Division
300 Adams Street
Hoboken, New Jersey 07030

Learn Fast Systems
R.D. #2, Box 429
Yardville, New Jersey 08620

Library of Congress
Catalog Publication Division
Washington, D.C. 20540

Library Filmstrip Center
3033 Aloma Street
Wichita, Kansas 67211

Link Educational Laboratories
P.O. Box 11073
Montgomery, Alabama 36111

Maclean-Hunter Limited
481 University Avenue
Toronto M5W 1A7
Ontario, Canada

Macmillan Company
866 Third Avenue
New York, New York 10017

Mafex Media Aids
90 Cherry Street
Johnston, Pennsylvania 15902

Massachusetts Department of Education
Division of Occupational Education
182 Tremont Street
Boston, Massachusetts 02111

McGraw-Hill Book Company
Princeton Road
Highstown, New Jersey 08520

McGraw-Hill Films
1221 Avenue of the Americas
New York, New York 10019

McKnight Publishing Company
P.O. Box 854
Bloomington, Illinois 61701

Michigan Department of Education
Vocational-Technical Education Service
P.O. Box 928
Lansing, Michigan 48904

Michigan State University
Instructional Media Center
East Lansing, Michigan 48824

Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

Minneapolis Public Schools
Department of Vocational-Technical
  Education
807 N.E. Broadway
Minneapolis, Minnesota 55455

Minnesota Instructional Materials Center
3300 Century Avenue North
White Bear Lake, Minnesota 55110

Minnesota Research
Coordinating Unit in Occupational
  Education
University of Minnesota
145 Peik Hall
Minneapolis, Minnesota 55455

Minnesota State Department of Education
Vocational-Technical Education Division
Capitol Square Building
550 Cedar Street
St. Paul, Minnesota 55101

Modern Talking Picture Service
Film Scheduling Center
2323 New Hyde Park Road
New Hyde Park, New York 11040

Nassau County BOCES
Occupational Education Division
1196 Prospect Avenue
Westbury, New York 11590

National Aeronautics and Space Administration
Technology Utilization Office
P.O. Box 8756
Baltimore-Washington International Airport
Baltimore, Maryland 21240

National Audiovisual Center
General Services Administration
Washington, D.C. 20409

National Educational Media
15760 Ventura Boulevard
Encino, California 91436

National Laboratory for The Advancement
  of Education
The Aerospace Education Foundation
1750 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

National Learning Corporation
212 Michael Drive
Syosset, New York 11791

National Micrographics Association
Suite 1101
8728 Colesville Road
Silver Spring, Maryland 20910

National Referral Center for Science
  & Technology
Library of Congress
Washington, D.C. 20540

Nebraska Research Coordinating Unit
  for Vocational Education
Box 33
Henzlik Hall
University of Nebraska
Lincoln, Nebraska 68508

Nebraska State Department of Education
Division of Vocational Education
233 South 10th Street
Lincoln, Nebraska 68508

Nelson C. White Company
102 West 25th Street
Baltimore, Maryland 21218

New Hampshire Department of Education
Division of Vocational-Technical Education
105 Loudon Road
Concord, New Hampshire 03301

New Mexico Department of Education
Education Building
Santa Fe, New Mexico 87501

New York State Education Department
Bureau of Trade and Industrial Education
99 Washington Avenue
Albany, New York 12210

North Carolina Department of Public
  Instruction
Occupational Education Division
Raleigh, North Carolina 27611

Northwestern Curriculum Coordination
  Center
Washington State Coordination Council
  for Occupational Education
222 Airdustrial Park
Olympia, Washington 98504

Oklahoma Curriculum and Instructional
  Materials Center
State Department of Vocational and
  Technical Education
1515 West Sixth Avenue
Stillwater, Oklahoma 74074

Oregon Board of Education
Division of Community Colleges and
  Career Education
942 Lancaster Drive, N.E.
Salem, Oregon 97310

Oswego County BOCES
Mexico, New York 13114

Pace Educational Media
P.O. Box 1668
Hollywood, California 90028

Pathescope Educational Films
71 Weyman Avenue
New Rochelle, New York 10802

Pennsylvania Department of Education
Office of Information and Publications
P.O. Box 911
Harrisburg, Pennsylvania 17126

Personnel Research Laboratory
Aerospace Medical Division
Lackland AFB, Texas 78236

Prakken Publications
416 Longshore Drive
Box 623
Ann Arbor, Michigan 48107

Prentice-Hall
Educational Book Division
Englewood Cliffs, New Jersey 07632

Prentice-Hall Media
150 White Plains Road
Tarrytown, New York 10591

Project CAREER
301 North Main Street
Randolph, Massachusetts 02368

Pyramid Films
P.O. Box 1048
Santa Monica, California 90406

Research and Curriculum Coordination Unit
Mississippi State University
Drawer DX
State College, Mississippi 39762

Reston Publications
11480 Sunset Hills
Reston, Virginia 22090

Robert J. Brady Company
Route 197
Bowie, Maryland 20715

Rockwell International
School Aids Department
N. Lexington Avenue
Pittsburgh, Pennsylvania 15208

Roundtable Films
113 N. San Vicente Boulevard
Beverly Hills, California 90241

R.R. Bowker Company
P.O. Box 1807
Ann Arbor, Michigan 48106

Sanford Central High School
Sanford Research Project
1708 Nash Street
Sanford, North Carolina 72330

Scott Education Division
Customer Service Department
Lower Westfield Road
Holyoke, Massachusetts 01040

Simmons-Boardman Publishing Corporation
350 Broadway
New York, New York 10013

Society of Die Casting Engineers
16007 W. 8 Mile Road
Detroit, Michigan 48235

Society for Visual Education
Singer Education Division
1345 Diversey Parkway
Chicago, Illinois 60614

Stanley Tools Division
The Stanley Works
New Britain, Connecticut 06051

Sterling Educational Films
241 East 34th Street
New York, New York 10016

Tab Books
Blue Ridge Summit, Pennsylvania 17214

TAD Products Corporation
639 Massachusetts Avenue
Cambridge, Massachusetts 02139

Technical Education Research Center
44 Brattle Street
Cambridge, Massachusetts 02138

Technical Publishing Company
1301 So. Grove Avenue
Barrington, Illinois 60010

Texas Education Agency
201 East Eleventh Street
Austin, Texas 78701

Theodore Audel and Company
Division of Howard W. Sams &
Company
4300 West 62nd Street
Indianapolis, Indiana 46206

Thompson-Mitchell & Associates
2996 Grandview Avenue, N.E.
Roberts Building
Atlanta, Georgia 30305

Thorne Films
1229 University Avenue
Boulder, Colorado 80302

3M Company
Visual Products Division
2501 Hudson Road
St. Paul, Minnesota 55101

U.S. Army Military Personnel Center
Military Occupational Research Division
2461 Eisenhower Avenue
Alexandria, Virginia 22331

U.S. Department of Agriculture
Office of Information
Photographic Division
Washington, D.C. 20250

U.S. Department of Housing and Urban Development
Federal Housing Administration
Washington, D.C. 20036

U.S. Department of Labor
Bureau of Apprenticeship and Training
601 D. Street, N.W. Room 5000
Washington, D.C. 20213

U.S. Government Printing Office
Superintendent of Documents
Washington, D.C. 20402

U.S. Marine Corps
Office of Manpower Utilization
Marine Corps Development and Education Command
Quantico, Virginia 22134

U.S. Office of Education
Division of Occupational and Adult Education
400 Maryland Avenue, S.W.
Washington, D.C. 20202

United Transparencies
P.O. Box 888
Binghamton, New York 13902

United World Films
221 Park Avenue, South
New York, New York 10003

University of California
Extension Media Center
Berkeley, California 94720

University of Delaware
College of Education
Newark, Delaware 19711

University of Georgia
Division of Vocational Education
College of Education
629 Aderhold Hall
Athens, Georgia 30601

University of Illinois
Visual Aids Service
Division of University Extension
Urbana, Illinois 61801

University of Iowa
Audio-Visual Center
C-5 East Hall
Iowa City, Iowa 52242

University of Maryland
Department of Industrial Education
J.M. Patterson Building
College Park, Maryland 20742

University of Michigan
Audio-Visual Education Center
416 Fourth Street
Ann Arbor, Michigan 48103

University of Minnesota
Audio-Visual Library Service
Continuing Education & Extension
3300 University Avenue, S.E.
Minneapolis, Minnesota 55414

University of Toledo
Department of Vocational Education
2801 West Brancroft Street
Toledo, Ohio 43606

Utah State Board of Education
1400 University Club Building
136 East South Temple Street
Salt Lake City, Utah 84111

Utah State Board for Vocational Education
250 East Fifth Street
Salt Lake City, Utah 84111

Virginia State Department of Education
Publication Information and Publications
Richmond, Virginia 23216

Vocational Curriculum Development and Research Center
P.O. Box 657
Natchitoches, Louisiana 71457

Vocational Curriculum Laboratory
State of Tennessee
Department of Education
P.O. Box 1114
Murfreesboro, Tennessee 37130

Vocational Education Resource Center
Regional Office of Education
Box 729
Hato Rey, Puerto Rico 00917

Vocational Instructional Services
F.E. Box 182
Texas A & M University
College Station, Texas 77843

Vocational-Technical Curriculum Laboratory
Rutgers University
Building 4103 - Kilmer Campus
New Brunswick, New Jersey 08093

Vocational-Technical Education Consortium of States (V-TECS)
Southern Association of Colleges and Schools
795 Peachtree Street, N.E.
Atlanta, Georgia 30308

Washington State Board for Vocational Education
Old Capital Building
Olympia, Washington 98504

Wayne State University
College of Education
Detroit, Michigan 48202

West Virginia Department of Education
Coordinator of Curriculum Development
1900 Washington Street East
Charleston, West Virginia 25305

West Virginia Vocational Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

Westinghouse Learning Corporation
1460 Westinghouse Building
Gateway Center
Pittsburgh, Pennsylvania 15222

Westinghouse Learning Press
100 Park Avenue
New York, New York 10017

Xerox Education Publications
P.O. Box 2639
Columbus, Ohio 43216

Xerox Learning Systems
600 Madison Avenue
New York, New York 10022

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